Power Mac News: What Hinders Performance? Page 49

JULY 1994

Macworld

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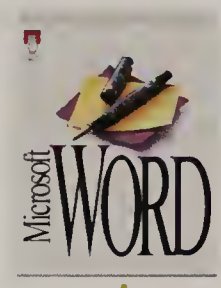
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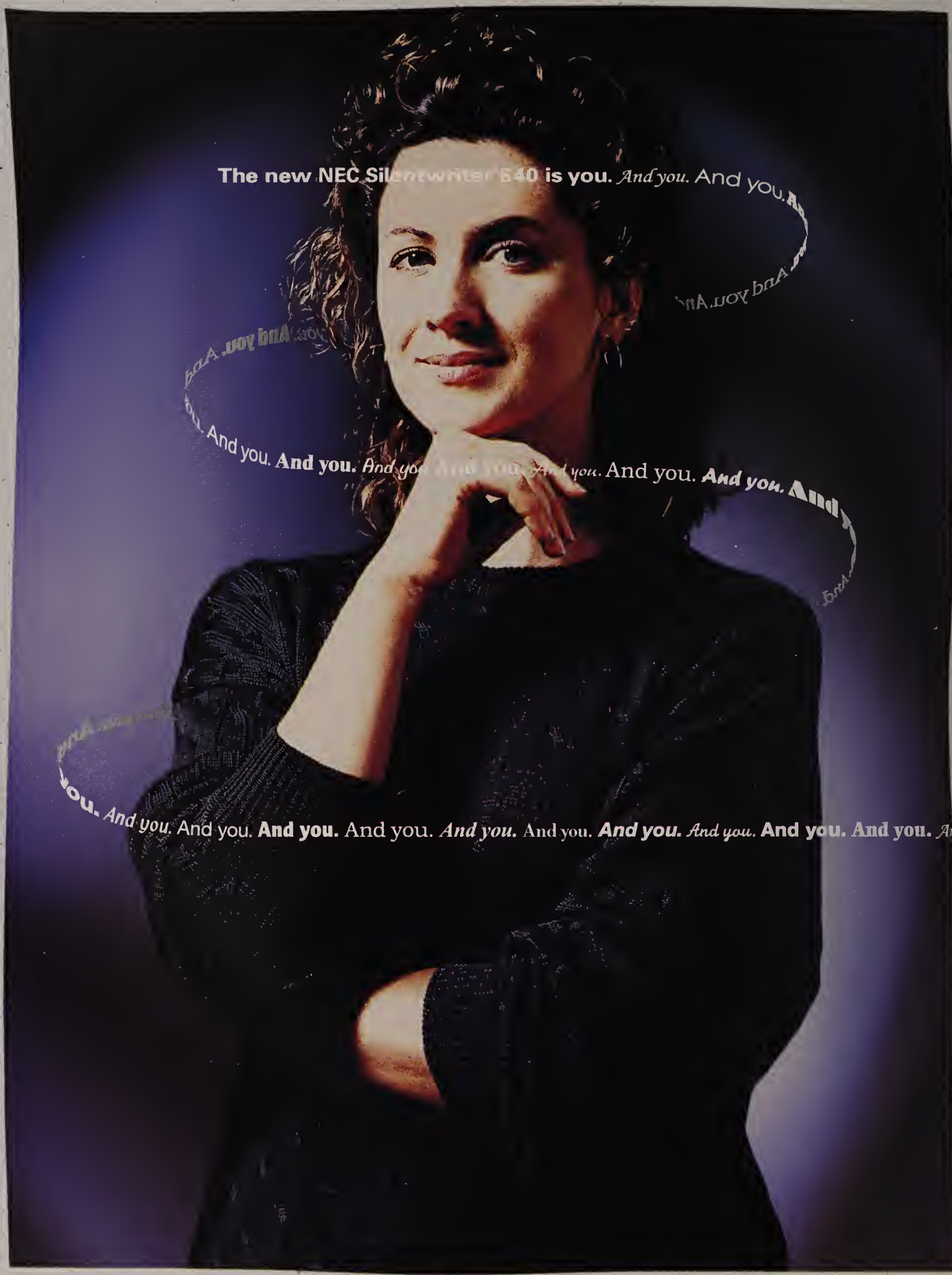




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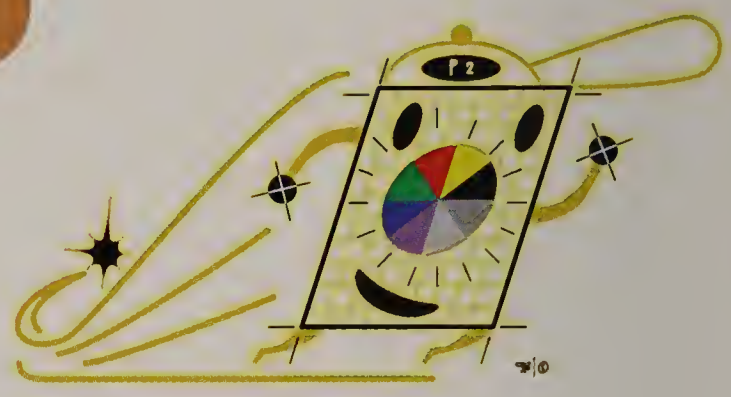
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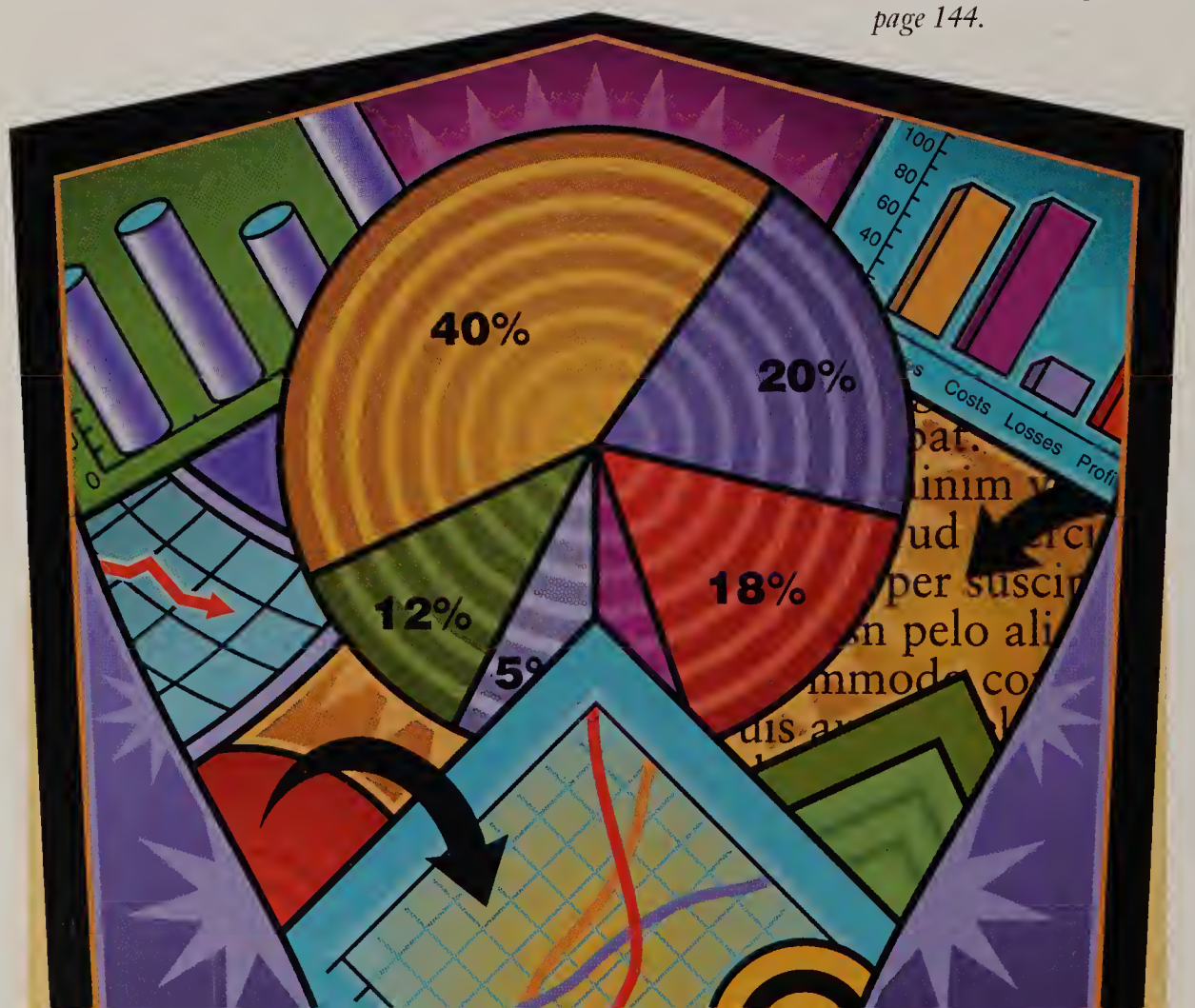
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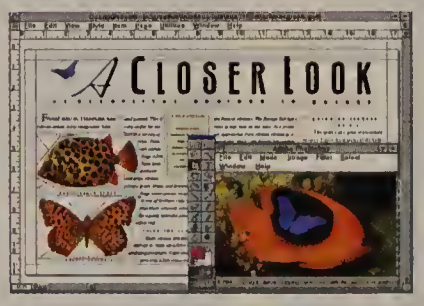
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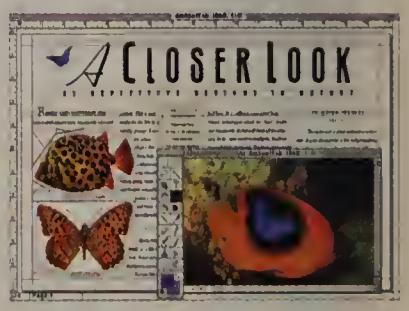
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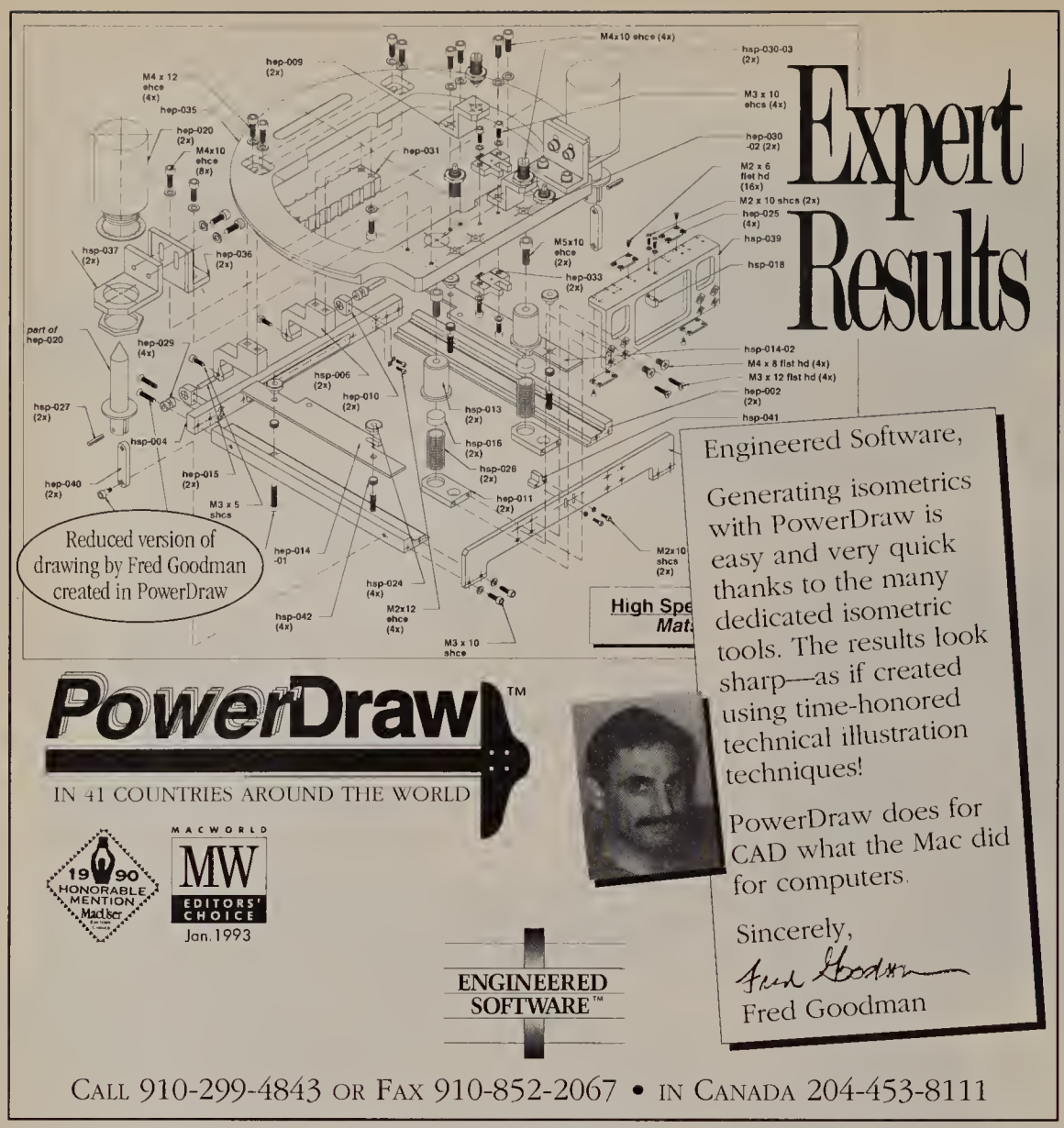


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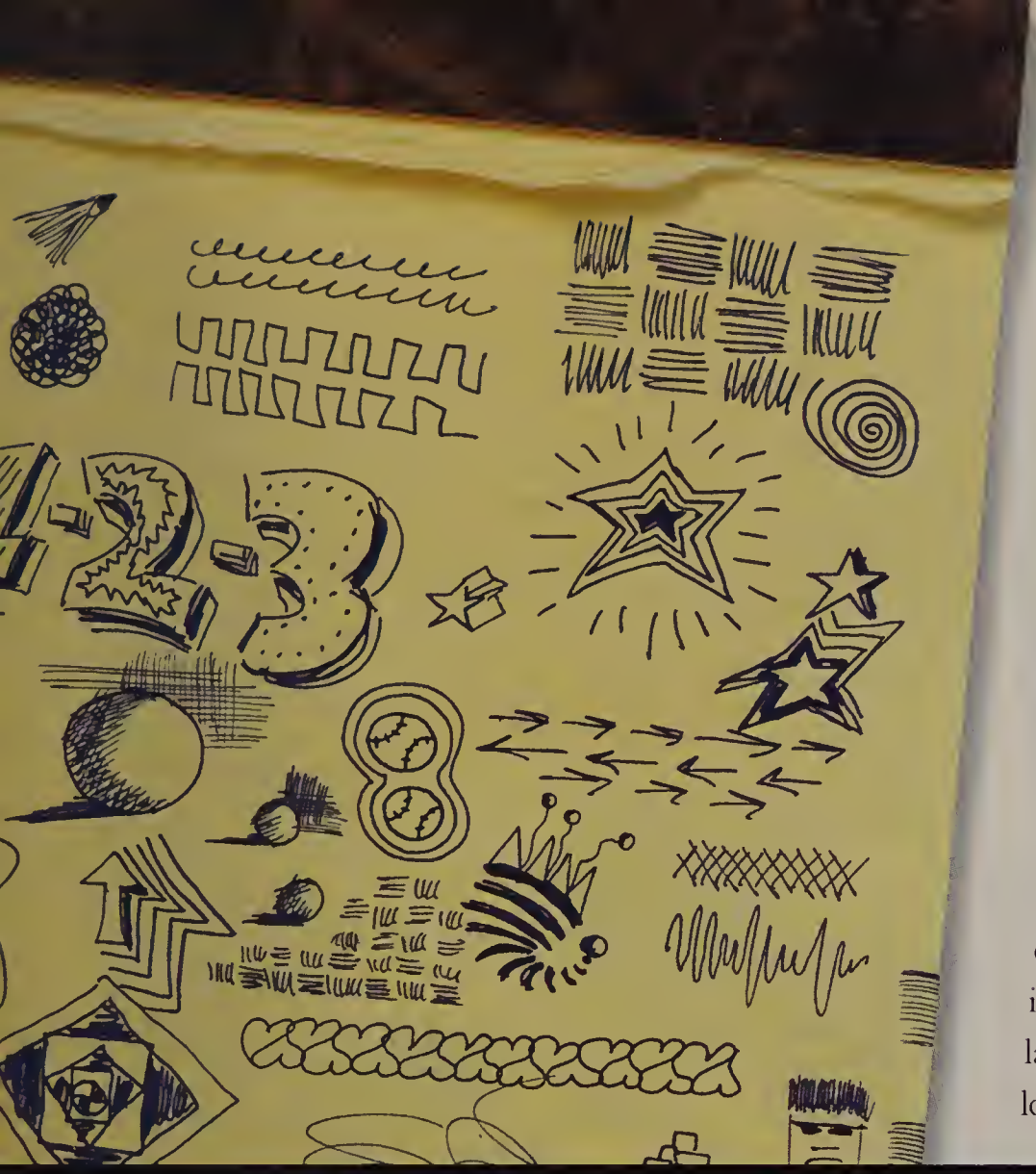
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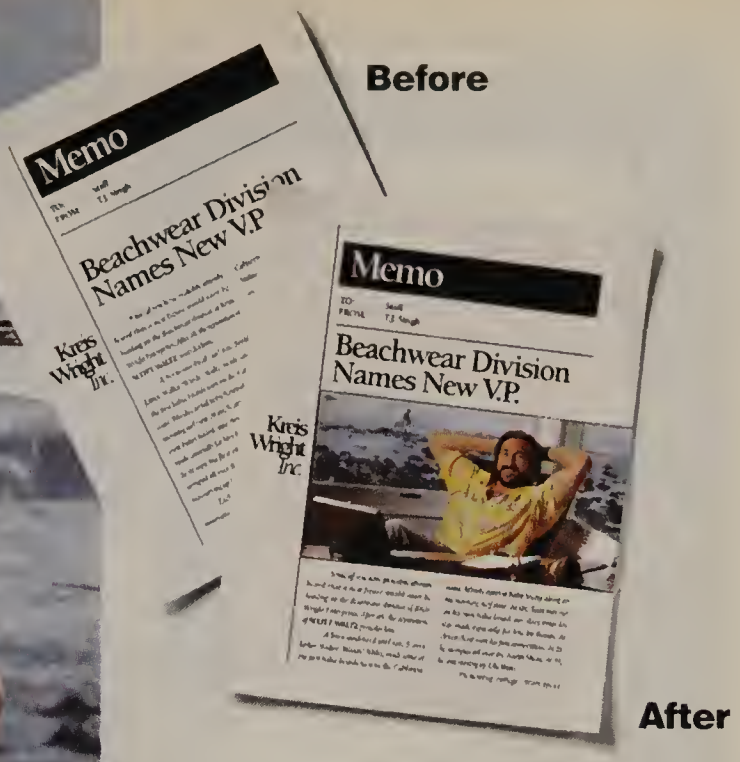
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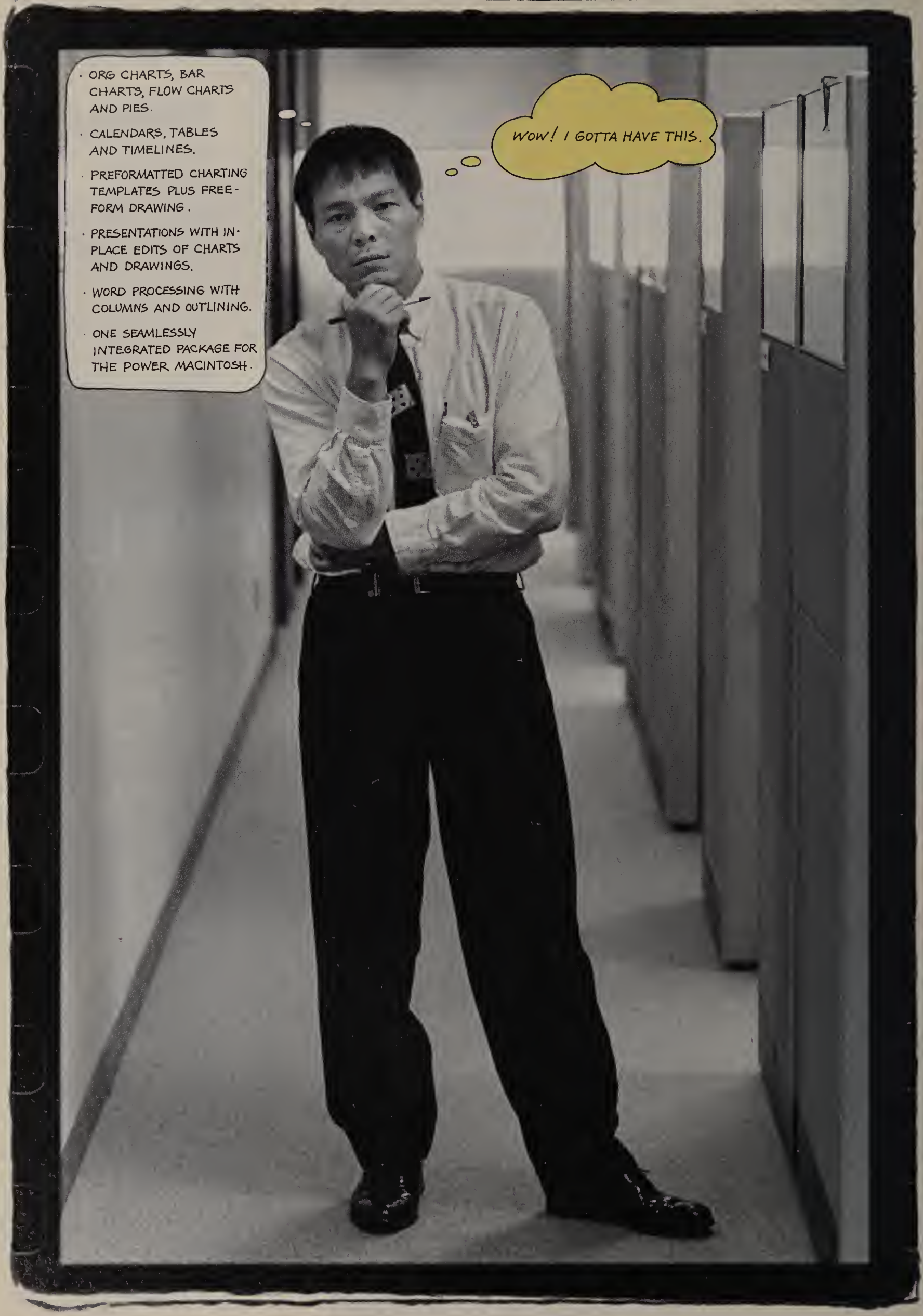
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It's one of a kind.

Unlike other business graphics solutions, ClarisImpact is fully integrated. Which means combining text and graphics is a snap. Editing your images is every bit as easy—you never even have to leave the document you're working on.

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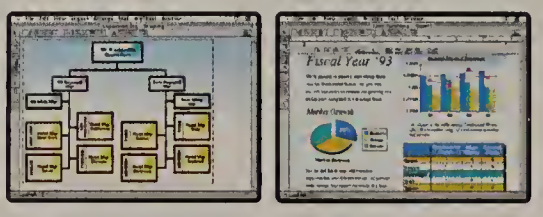
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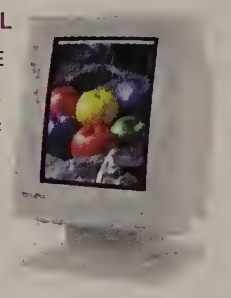
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Introducing Joule™, a modular system so innovative it redefines mass storage.



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The Joule™ Modular Storage System

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The Joule Top Cap



Joule 2.5" Hard Drive Module with Mount



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The Joule Base

The Joule system and switchable active termination are patent pending.

Like building blocks, Joule tops one great drive with another—No tools required.

There's a reason Joule (pronounced "Jewel") doesn't look like other mass storage systems. It isn't. Joule is modular. Uniquely versatile. Unconventionally easy-to-use. And unexpectedly elegant.

Joule is a revolutionary concept that transcends the boundaries of conventional drive engineering. It allows you to combine a variety of hard disk drive and removable media drive options into a single vertically interlocked system.

Joule's modular concept eliminates cumbersome redundancies in cables, power supplies and circuitry. It's unique tower design makes installation child's play and expanding or changing your system effortless and fast. It also allows you to move drive modules in and out of the system—at will—without affecting the SCSI chain.

Joule reinvents the "ins and outs" of portable mass storage.

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Joule Base with 1080MB Hard Disk Installed, plus 105MB SyQuest Module and 270MB Hard Disk Module



340MB Joule Base

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advantages are simply towering.

The ultimate in plug n' play versatility. Here's how it works.

The Joule Base combines a hard drive or removable drive mechanism with a universal 100 watt power supply and standard SCSI circuitry plus a unique list of performance and convenience features. It can operate alone or support up to seven mounts and drive modules. Each features La Cie's exclusive LaCieTerm™ digital active termination switch (patent pending), a SCSI port and ID switch, and two auxiliary power outlets for attaching other SCSI peripherals. The power switch, activity LED and termination status LED are conveniently located in the front.

Joule Mounts pass power and SCSI signals from the base through each interlocking mount (patent pending). Mounts also allow modules to be inserted or removed, leaving the SCSI chain intact.

Joule Drive Modules offer even greater selection. Hard disks from 170MB to 2050MB, plus a full range of SyQuest, optical, tape and DAT modules are available to complete your system.

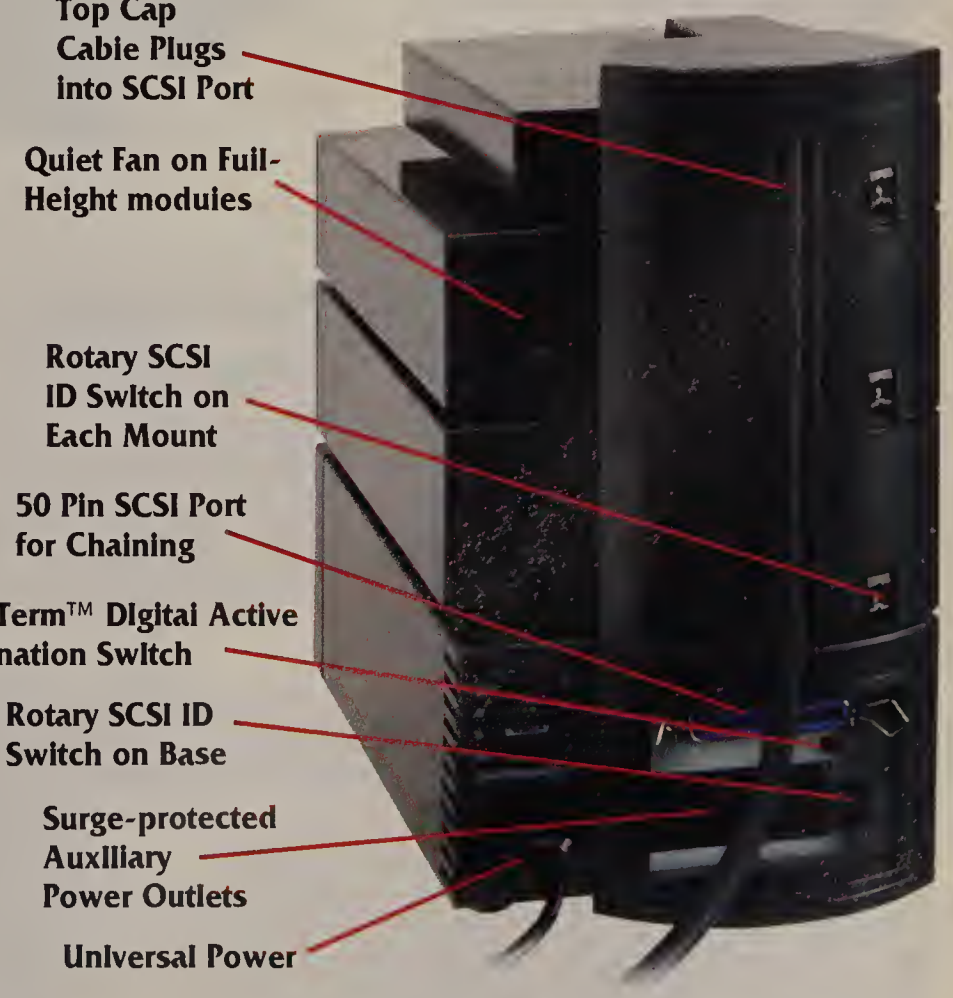
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Building on a firm foundation.

With Silverlining disk management software, Quantum quality, a great warranty and toll-free technical support, Joule offers every La Cie advantage. As a Quantum Company, La Cie is backed with a Fortune 500® commitment to quality and service.



Joule System Rear View



Joule Base with 1080MB Hard Disk Installed, plus 2050MB Hard Disk Module, 2050MB Hard Disk Module (detached), 2050MB Hard Disk Module and 1080MB Hard Disk Module

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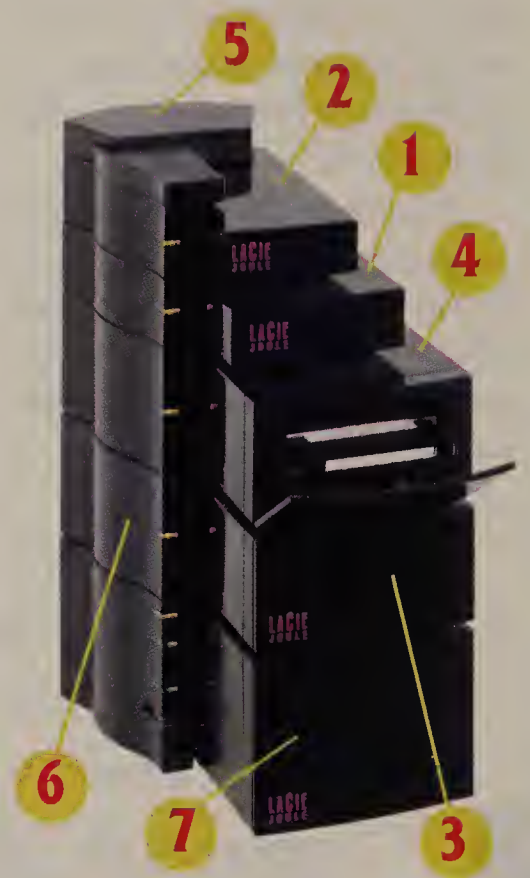
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NEW! 1440MB	$1189	$1159
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1080MB	$859	$919
NEW! 1440MB	$1099	$1159
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1800MB	$1199	$1259
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	$69	$99	$79	$99	$109

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Circle 57 on reader service card



BY ADRIAN MELLO

Grading the Latest Macs

Power Macs and PowerBooks

ONCE AGAIN, IN MERE MONTHS Apple has remodeled almost the entire Macintosh lineup. For longtime Macintosh users it's now a dreamlike world in which Apple is the value or performance leader in many niches. This means it's hard to go wrong buying a Mac, and we no longer have to put up with the snickers of PC users. This month I grade the new Power Macs and the new PowerBooks. I also update the grade of one Quadra for good measure. Overall, this is the best report card I've ever given to Apple's lineup, and these high marks testify to how far Apple has come in meeting its customers' needs.

I grade each of the models, but as usual, these grades are preliminary and should not be mistaken for full reviews.

Blackbird Flies

Let's start with the latest development, the new PowerBooks. The 500 series, code-named Blackbird, is the first big change in the all-in-one PowerBook lineup. These 68040-based models are faster and offer better screen options, longer battery life, greater expandability, and a better keyboard and pointing device. Finally, now that Apple offers the Global Village modem as an option, you can buy a decent modem.

More and more users have been getting rid of their desktop systems and operating solely on their PowerBooks. Building video into the 160 and 180 series models was Apple's acknowledgment of this working style. Several new features of the 500-series models make them even stronger candidates to replace desktop systems. These features include the higher RAM ceiling of 36MB, a full-size keyboard, built-in Ethernet, support for larger monitors, and PowerPC upgradability—all of which make the 500 series more than adequate for most users who want to attach their Mac to a color monitor or a network. With the improved keyboard and pointing device, most users probably won't need to buy a separate keyboard and mouse for use at their desks (see "PowerBooks: The Next Generation," in this issue).

If you configure your PowerBook 500 with a large-screen monitor, a big hard disk, and a generous amount of RAM, you should even be able to create reasonably demanding page layouts and presentations without much compromise, comparable to using a Quadra 610 or perhaps even a 650. Don't expect a 500-series PowerBook to perform like a Power Macintosh, but many users won't need that much power. On the downside, there's no FPU, and Apple should have equipped the 500 models with at least 8MB of RAM—4MB is no longer comfortable.

The 500s' Fortunes

Looking at the individual models, the 520 and 520c are good replacements for the



165 and 165c. The 520 and the 520c both get a solid B. If they cost a little less, they would get a B+. I would wait a little before buying one, because I think the prices will drop after initial pent-up demand is satisfied. Lowering the price would also address another problem: the PowerBook line doesn't offer a really compelling value at the low end. The 145B and 165 are yesterday's news. Improvements in portable-computing technology (and most other PowerBooks) have passed them by. Apple needs to offer an up-to-date solution for value-conscious customers. The 145B gets a C–. The 165 is particularly out of place and deserves a D because it is not much less expensive than a 520. If the 520 and 520c cost a little less, demand for the 165 would go away. Even so, because of their excellent (noncolor) active matrix screens, I would still consider a closeout deal on the discontinued PowerBook 180 or even a used 180 or 170 before buying a passive matrix 145B, 165, or 520, even if the 180 were the same price.

The 540 and 540c models are faster and include better screens and an extra battery (the new battery is expensive, at $125). The 520c's dual-scan passive matrix color is better than the color of earlier passive matrix displays, but in my estimation, active matrix screens are simply superior. Having used PowerBooks with both screen types, I've found that working with a lower-quality screen is like peering through frosted glass. For laptops I still prefer the appearance and longer battery life of black-and-white screens, but because of the 540c's combination of four hours of battery power and an active matrix screen, it's the first color PowerBook I would seriously consider. With all this in mind, I give the 540 and 540c an A–. I would have given them a solid A except that they cost a little too much and don't include an FPU.

The Duo 280 and Duo 280c are not completely new; they simply update (and replace) the 250 and 270c. The new models do benefit from a boost in speed, so they are an appealing alternative to the all-in-one design of the 500 models. For this reason the Duo 280 receives an A–, while the color Duo 280c receives a B because the 580c is a better solution for color users. If you really need a color portable, you probably will need to attach to an external monitor at times. The 580c has built-in support for an

continues

GLEN MITSUI/STUDIO MO

external monitor. The Duos require a MiniDock (with its extra weight) to attach to a monitor. I've used all of the PowerBooks, and I'm happiest with my Duo 250, which I use with the Duo Dock, an elegant solution to the dilemma of desktop versus portable.

Power to the Macintosh

The Power Macintosh was the biggest step forward in Apple's desktop line since the color Mac in 1987. We previewed the Power Mac in depth in our May issue. Surprisingly, the most compelling Power Mac is the low-end 6100/60. If you are in the market for a desktop machine and you don't need to add a lot of boards, this is the way to go. I have routinely seen prices under $1600 for a configuration with 8MB of RAM and a 160MB hard drive (not including monitor or keyboard). The additional cost for this model over the Quadra 610 is often less than $300. The Power Mac 6100/60 deserves an A–.

The Power Mac 7100/66 and 8100/80 are good machines, but their appeal is limited for now because of the scarceness of native Power Mac software. The 7100/66 gets an A, and the 8100/80 gets a B based on price/performance. If you rely on applications that are not yet available in native mode, then you should subtract a grade from any Power Mac until the necessary software ships.

For the time being, I recommend the Quadra 650 for those who want to have their cake and eat it too. I've seen this model priced at $2300, and it's still the best price/performance value among the 680X0-based Macintoshes. When the native Power Mac applications you need are ready, you should be able to purchase Apple's PowerPC upgrade card and get 66MHz PowerPC performance. At $700 this card is very reasonably priced; even after you add this cost to the price of the Quadra 650 you still come out ahead. For the next few months, the Quadra 650 is the best option for users whose work depends on software that's not yet offered in native Power Mac versions. Because of its overall value and the upgrade-card strategy, the Quadra 650 earns an A– and ties for top honors.

Macworld and the Power Macs

Speaking of honors, I'm pleased to say that the Computer Press Association recently selected *Macworld* as Best Computer Magazine for 1993 (in the highest-circulation category). It's especially gratifying that the computer-journalism professionals who make up the CPA have honored *Macworld* with this award for the fourth year in a row. But we didn't get to this point by standing still—as part of our constant efforts to make *Macworld* more useful and to improve our in-depth coverage of the Power Mac transition, we added the *PowerPC News* section (now called *Power Mac News*) even before the new machines began shipping. Because our Power Mac coverage now extends across the entire magazine, this month we are adding a logo that identifies any coverage pertinent to the Power Macintosh. Power Macs will eventually affect all users, and we intend to ensure that you can easily find Power Mac information in our pages.

So far, the Power Mac transition seems to be going very well. Apple recently announced that it sold 175,000 Power Macs in the first few weeks after their introduction. No insoluble problems have surfaced, and all our gauges show that interest in Power Macs is intense. *Macworld* is committed to being the best source of information on the Power Macintosh during this exciting time. m



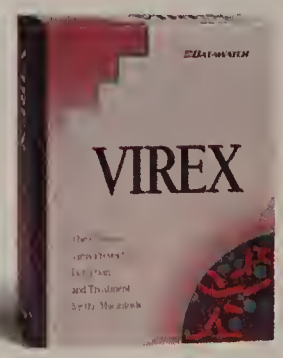
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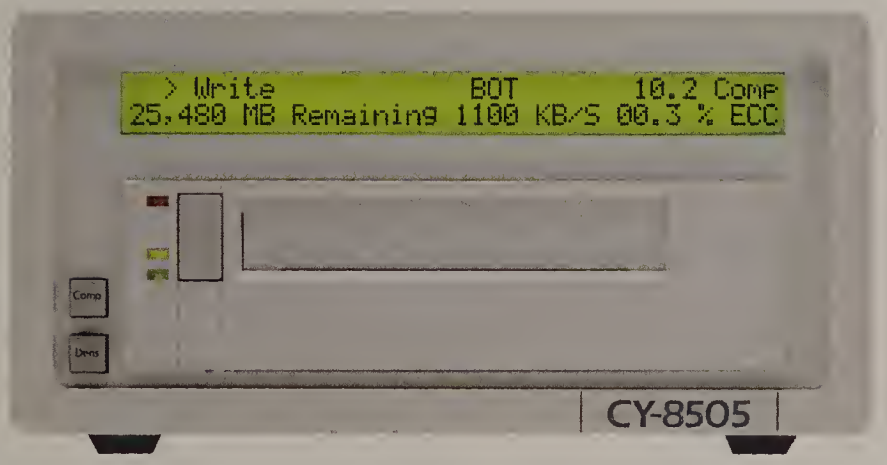
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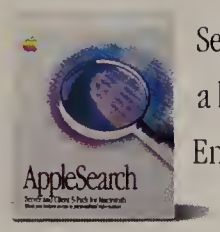
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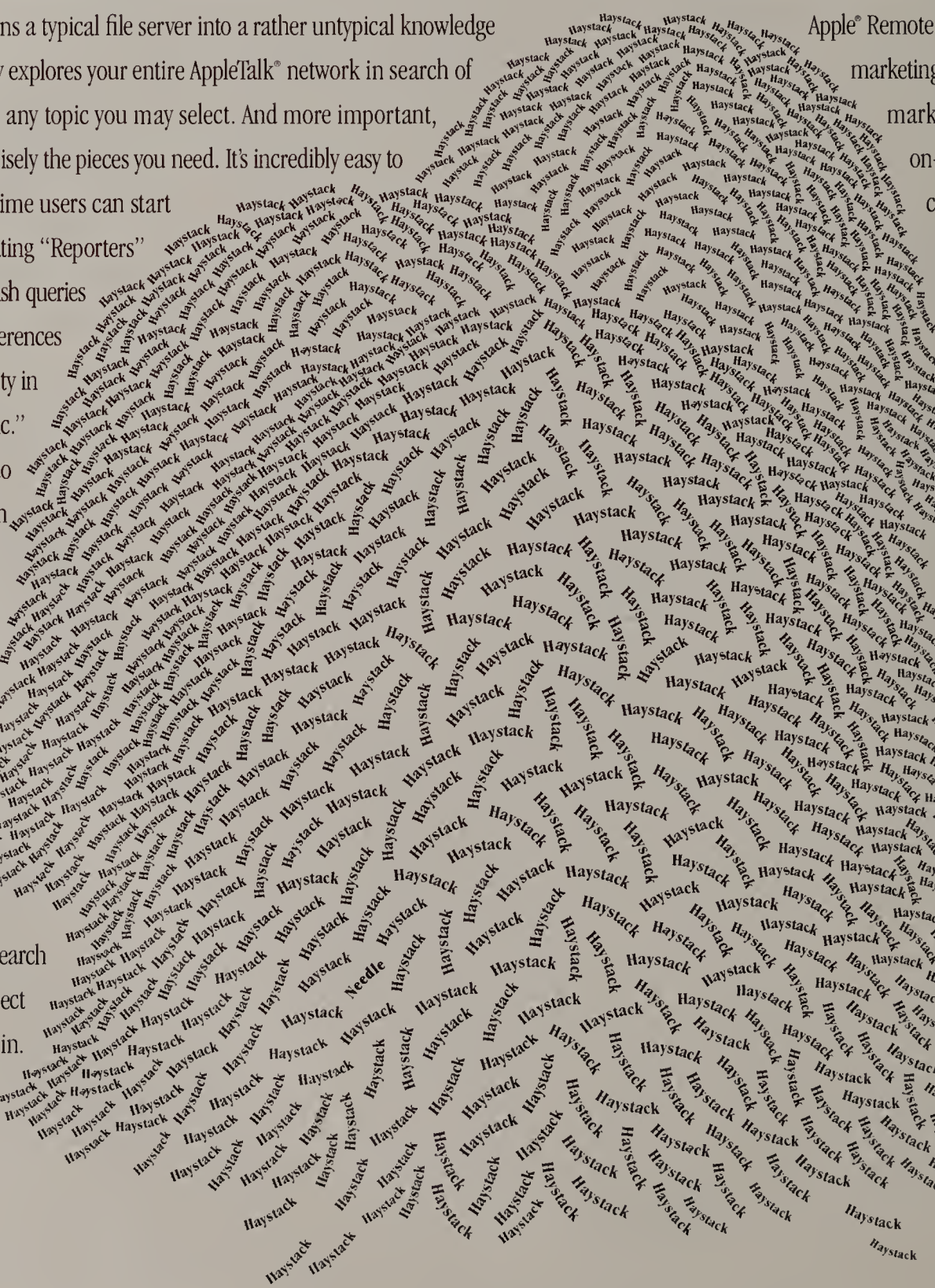
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Letters

Here Comes Trouble

GENE STEINBERG'S GENERALLY COMplete article about troubleshooting system-level problems ("Troubleshooting Tips and Tools," April 1994) does not emphasize enough Apple's own Disk Tools disk, still included free with all Macintoshes (except Performas). I am a frontline technical-support specialist working for a major software publisher, and I would speculate that less than 20 percent of my callers know the value of the Disk Tools disk. Except for this omission, the article was well written, and a great description of what options are available when problems arise.

Max Pruden
Hayward, California

Disk Tools can be a good first line of defense in case of disk trouble, but readers should be aware that the Apple HD SC Setup component of the Disk Tools disk works only with hard drives purchased from Apple, as Apple adds an ID code to the ROM of drives that it sells. The other component of the Disk Tools disk is the Disk First Aid utility, which works with non-Apple drives, if they follow Apple's partition structure. But that means that drives formatted with La Cie Silverlining, for example, can't be checked. It doesn't make much difference, though, since Disk First Aid has limited recovery options.—Ed.

ONE EXTENSION MANAGER YOU overlooked is the shareware utility Symbionts, which goes several steps beyond Extensions Manager. Symbionts works like Extensions Manager (moving stuff from one folder to another) but it has a much nicer interface (System 6 control-panel–style). You can also throw away extensions and save frequently used sets of extensions.

Greg Scarich
via the Internet

WHEN INSTALLING A NEW SYSTEM Folder on your Mac, don't overlook the Scrapbook file, especially if you keep important artwork or other clips



there. Too many times, I have replaced all my other INITs and preference files and forgotten about my Scrapbook.

Mark Foster
Asuza, California

Barbarians at the Gate

STEVEN LEVY, I ENJOYED YOUR article about Apple and the Internet (*The Iconoclast*, March 1994). We seem to be in similar situations. After an extremely trying period that spanned about two weeks, I'm finally up and running with a TCP/PPP account. What a nightmare!

Your idea of Apple supplying a built-in interface to the Net sounds great. The only problem I see with the proliferation of recent Internet activity is that logjams have resulted. I often have Archie requests turned down because of overburdened systems at host FTP sites. If every Joe with a Mac has easy access to the Net, won't the system become overloaded? A lot of these sites have "real" work to do. I'm surprised I haven't seen more people addressing this issue.

If Apple opens the floodgates to the Net as you suggest, it may be saddled with the demise of the Net as a useful research and academic tool, rather than hailed as a champion of the common weal. I don't believe the system can handle the load.

Bruce MacLeod
via America Online

Heart Attack

I READ WITH INTEREST IN THE APRIL 1994 issue of *Macworld* a review of Caduceus Science Review Macintosh Project 1.0. The review shows a Caduceus diagram of a heart that grossly and erroneously misidentifies the left ventricle as the left atrium. The reviewer points out that there are a "few incorrect explanations." Such an obvious and simplistic error does not bode well for premed students using the program to bone up on their skills for the MCAT test.

Timothy Dickinson
Henderson, Nevada

Actually, I meant to showcase the misspelling *deoxyginated* in the diagram's text, and the atrium/ventricle problem was just a bonus. Caduceus Project actually goes through a rigorous proofreading cycle (the mistakes in this figure were corrected within a few weeks of release), but *Macworld* got one of the first 100 disks in the production run for review. Version 1.05 is currently shipping, and the vendor has cleared up nearly all the problems I found in the earlier version.—Charles Seiter

April What?

AM I THE ONLY ONE WHO, AFTER reading Lon Poole's April *Quick Tips*, immediately powered up their Mac and performed the four-corners–plus–option-P-R-O routine?

Imagine my shock when my Mac icon darkened and the coveted word *Pro* appeared after the model name, just like Lon said it might! My Mac seems to run only three times as fast, not the four times

continues

WARD SCHUMAKER



CORRECTIONS

- *Since "The Power Macintosh Arrives" was written, Apple has changed some information that we ran in that feature's "Making AV Technology Mainstream" sidebar (May 1994). To get the Express Modem software, you need to buy a GeoPort telecom adapter. Also, to get the PlainTalk software, you must either purchase an AV model or buy the software separately.*
- *Contrary to the May 1994* New Products *report, Sonnet Technologies' BudgetBooster does not support the Color Classic, and the LC version of the card has a 25MHz 68020 chip.*
- *Graphisoft's PowerPC upgrade offer for ArchiCAD has some caveats not reported in our April 1994 "PowerPC Apps" item in* PowerPC News. *The plan is limited to customers who bought the software between October 1, 1993, and January 31, 1994, and also paid $95 for the upgrade plan.*
- *The May 1994 review of Connectix's RAM Doubler 1.0.1 should have mentioned that the software is compatible with System 6.0.5.*
- *In the April 1994 review of the LaserWriter Select 360, two printer names were transposed. We should have said that the LaserWriter Select 360's output doesn't look as crisp as that of the LaserJet 4M with Resolution Enhancement technology. The change does not affect our evaluation or rating.*
- *Also in April* Reviews, *Passport Producer Pro's Cons should not have included the word* expensive. *This would not have changed the rating.*
- *The correct number for ordering TouchBase and DateBook is 800/888-6293 (*At Work *news, May 1994).*
- *In the May feature "Smart Thinking," Inspiration was incorrectly criticized as being unable to import files created with other applications. In fact it can import text files and More files.*
- *Microtek's phone number is 310/297-5000 (*Graphics *news, June).*

Lon promised, but that's all right. What else would one expect from a 1-in-10,000 shot at perfection?

My only problem is deciding whether to keep my Mac Pro, offer it for sale to Lon at a high premium, or read his entire column next time before rushing off to try his tips and tricks. Do you have any suggestions? Oh, and by the way, where can I buy that ADB booster?

Mike Morris
Trabuco Canyon, California

Darn it, Mike, we just ran out of ADB Power Booster 1000s. But hold on, you're in luck—we've got this here bridge in San Francisco that's for sale. What? You say that you don't own a major body of water? Well, for just a few dollars more, we'll throw in your very own bay. It just so happens we have one available. Call now, operators are standing by.—Ed.

Off-Price Monitors Might Work

IN YOUR JANUARY 1994 ARTICLE ON monitors ("Small Wonders"), you reviewed only the plug-and-play VGA monitors. While this avoids the possibility of buying an incompatible monitor, it also makes for expensive purchases. It's possible to buy a monitor with .28mm dot pitch, noninterlaced 60Hz refresh, and good color convergence for about $270 including an adapter. My monitor works with my Quadra 610's internal video, providing 16-bit color at SVGA resolution. It also offers on-the-fly hardware zooming and color filters, which I don't believe any of the reviewed monitors can do.

I realize that your lab doesn't have the time to test every monitor, and your magazine doesn't have the space to list the results of all of those tests. But a recommendation to visit the computer swap meets and trade shows (especially the PC ones)—where monitors range from $200 to $300—could save your readers hundreds of dollars.

Gabriel Rossman
via America Online

You can buy PC monitor adapters for $10 to $30 at Radio Shack, Fry's, CompUSA, and other electronics stores. The adapters are usually labeled for use with a specific major brand (typically Sony or NEC), but they'll work with most VGA monitors. However, there's no guarantee that an adapter will work if the monitor maker has done something nonstandard. We've said in previous monitor articles that this is an option you should consider; just be sure you can return the monitor if the company has no adapter of its own.—Ed.

Speedy LaserWriter Plus

FEBRUARY'S *MACWORLD* REVIEWED "high-speed" workgroup printers, most costing several thousand dollars ("Workgroup Printers"). One of the speed tests used a 20-page Word 5.0 document composed in 12-point Courier with three type styles. Apple's latest PostScript Level 2 driver (LaserWriter 8.1.1) prints such a document on a seven-year-old LaserWriter Plus in 175 seconds.

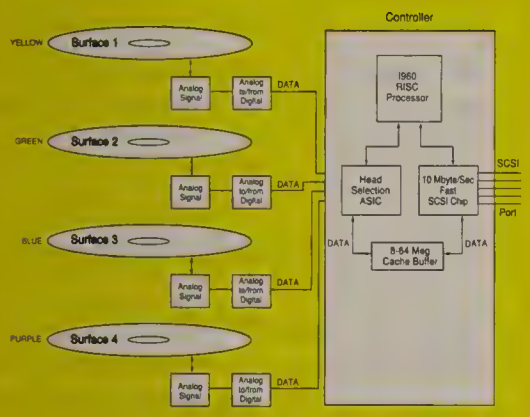
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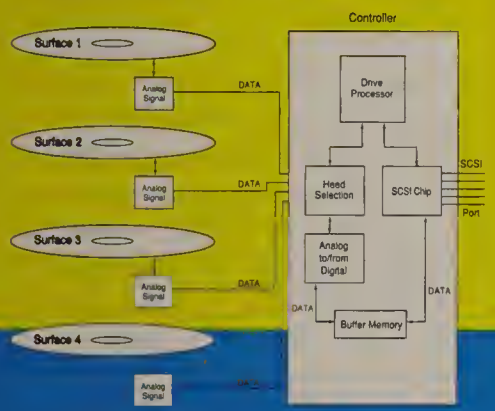
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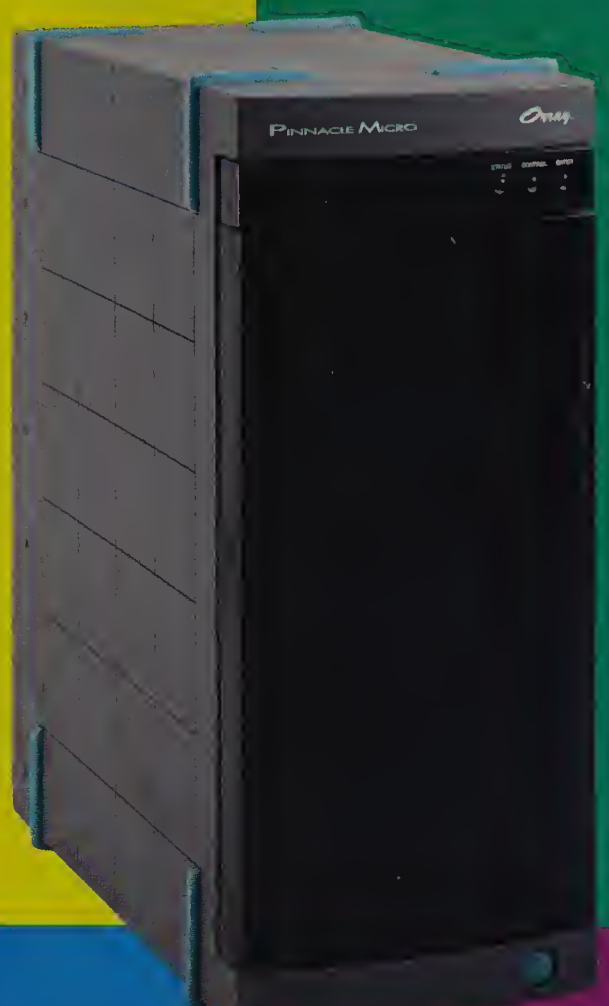
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Orray Architecture
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FEATURES

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Circle 117 on reader service card

This is comparable to 6 of the 12 printers tested by *Macworld*, when printing at 300 dpi. Before you buy a new printer, make sure you have given your old printer a fair chance with the newest software.

Gerald Wright
Portola Valley, California

It's true that the LaserWriter Plus uses an 8-pages-per-minute engine, and it has the same speed as most of the printers on the raw–engine-speed test. But when you print anything other than single-font documents, all printers reviewed in the article outrun the LaserWriter Plus.—Ed.

The Right Tools for the Job

AMY ROTHSTEIN OF WALTHAM, Massachusetts, writes in March's *Letters* that she uses search-and-replace techniques in Microsoft Word to massage files obtained from online services. Maybe she is not aware that Microsoft Word 5.X already comes with a text-with-layout converter that does exactly what she describes. Text with layout is defined as text with a hard break at the end of each line, and paragraphs separated by double line-breaks (carriage returns, in the case of the Macintosh Operating System). Unfortunately, you cannot install this text-with-layout converter using any of the configuration sets offered by Microsoft Word's installation script. You need to install it using the custom install features of the script. After you install the converter, a dialog box asking you to choose between plain text and text with layout appears every time you open a text file with Microsoft Word.

If you want a user-friendly utility for more-sophisticated text processing, I would recommend the shareware Add/Strip 3.0.3; or you can choose among at least eight or ten other freeware and shareware programs that give you better results, more speed, and less frustration than using search-and-replace in your word processor to preprocess your downloaded text files.

Pedro A. Lopez-Valencia
Washington, D.C.

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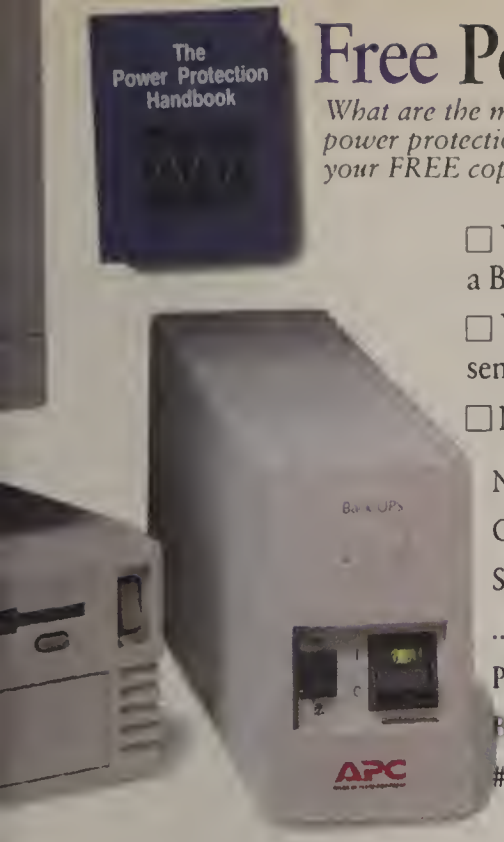
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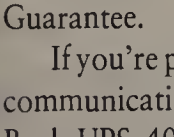
Don Traux knows first hand about Back-UPS reliability: "It ought to be against the law to buy a computer without an APC Back-UPS 250. I recently had a direct lightning hit right outside the house...my computer never blinked. Each morning I get a surge down the line and both APC's hate it - they simultaneously 'holler 'n clamp' while my 'Brand T' quietly sleeps in. I've relegated that unit to non-critical household stuff like my VCR."



Andrew Wargo, Manager at Baxter Land Company, tried two other brands before Back-UPS. "One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! I then bought my Back-UPS for less than half of what I had paid for the others. We've purchased three more Back-UPS and for the past 14 months they've been just hummin' away on the same power line that was eating the other brands alive!"

virtually all separate surge suppressors. Surge performance is even backed by a $25,000 Lifetime Equipment Protection Guarantee.

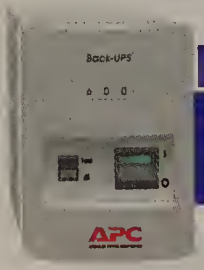
If you're protecting a network server, a communications interface port (on models Back-UPS 400 and higher) provides the security of an automatic shutdown to all major OS including NetWare, Windows, Windows NT, LAN Server, LAN Manager, LANtastic, SCO Unix, OS/2, Banyan Vines, AppleShare/System7 and more, so your data is safe whether the system is attended or not. (PowerChute software and interface kits sold separately.)

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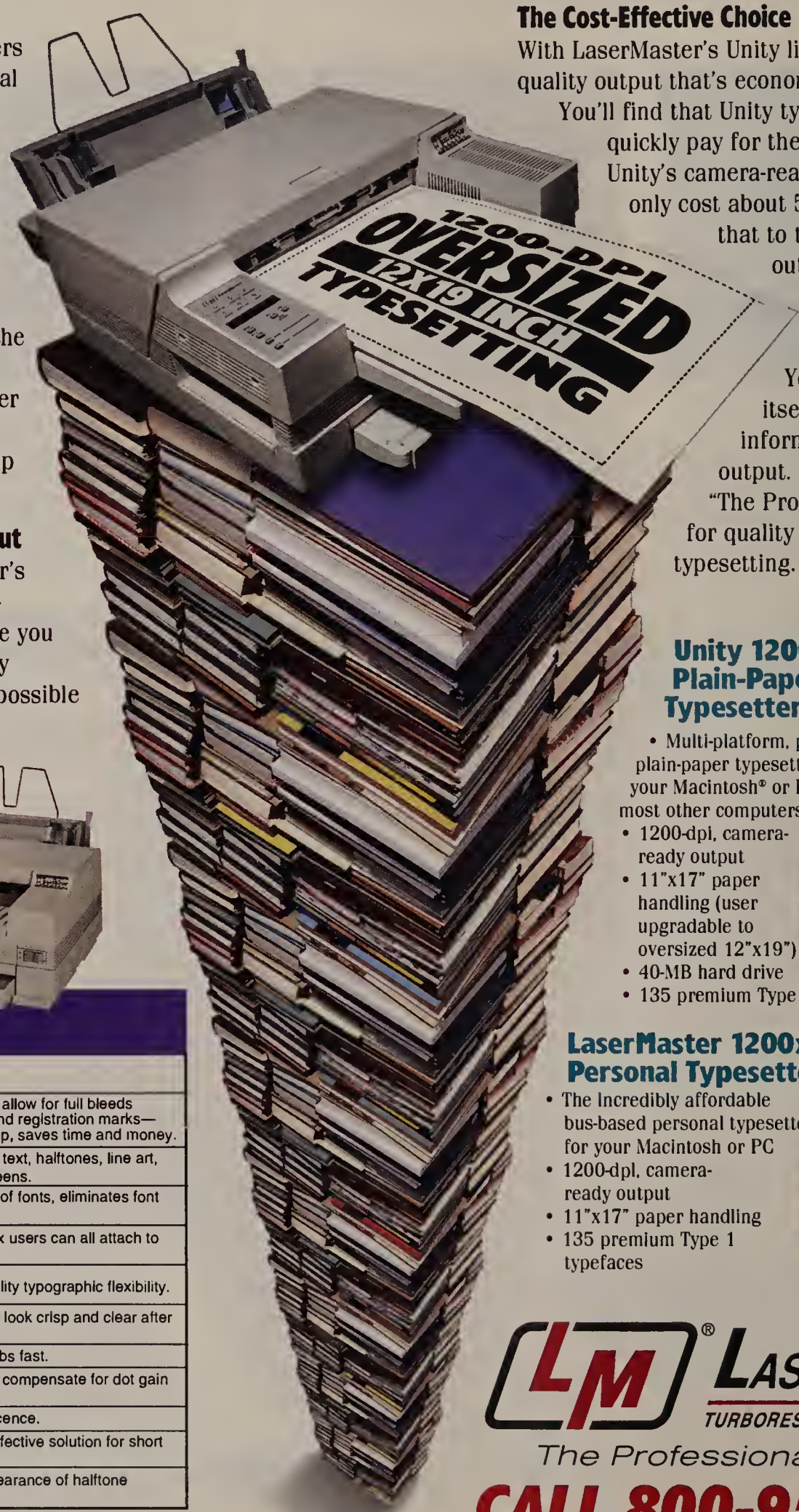
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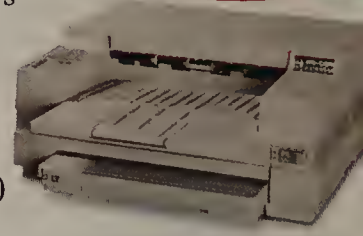
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Circle 43 on reader service card

LATE-BREAKING NEWS

MacBulletin

Aldus Ships PageMaker for Power Macs The eagerly awaited PageMaker 5.0 for Power Macintosh is now shipping from Aldus. The $895 Power Mac native version runs two to four times as fast as the existing PageMaker 5.0 does on the fastest 68040-based Macintosh, according to Aldus. Current owners of PageMaker 5.0 can upgrade for $179; owners of older versions can upgrade for $299. Aldus, 206/622-5500, 800/685-3543.

Quadra 605 Cheaper Apple has reduced its suggested price for the 8/160 version of the Quadra 605 (without monitor or keyboard) by $200, to $1069. The 25MHz 68LC040-powered computer also now comes in two Business Productivity Solution configurations: a 4/160 model priced at $1019, and an 8/250 version priced at $1329. Both business setups ship with eight productivity software packages, including Claris's ClarisWorks, Intuit's Quicken, Gold Disk's Astound, and Full Contact from FIT Software. Apple Computer, 408/996-1010, 800/776-2333.

Apple Hard Drives La Cie and Apple announced that La Cie will make and sell external hard drives under Apple's name. Apple is expected to bundle the external drives with some of its computers. Designed by Apple, the Apple External Hard Drive comes in capacities of 160MB, 230MB, 500MB, and 1GB and lists for $389, $479, $829, and $1299, respectively. Available now, the drives will be supported by both Apple and La Cie. La Cie, 503/520-9000, 800/999-0499.

Motorola Ships PowerPC 603 Motorola has begun shipping small quantities of the PowerPC 603 chip, which Apple is expected to use as the brains of low-end desktop and portable Power Macs.

Apple's Competitive Trade-in Program A trade-in program recently established by Apple allows end users to trade in name-brand personal computers and equipment for credit toward the purchase of new Apple equipment. Set up in conjunction with Micro Exchange, which deals in used systems, the program accepts systems, printers, or monitors bearing brand names including IBM, Compaq, Hewlett-Packard, Macintosh, and others. To locate the nearest participating Apple reseller, call 800/538-9696.

Altsys Sues Aldus Altsys, developer of FreeHand for Aldus, has filed suit against Aldus, claiming the proposed Aldus-Adobe merger violates an agreement between Altsys and Aldus that gives Aldus exclusive worldwide marketing rights to FreeHand. Meanwhile, Aldus and Adobe confirm that the Federal Trade Commission is continuing its investigation to ensure that the proposed merger does not create a monopoly.

Brøderbund and EA Merger Off Saying that their stock prices had changed and that they had reassessed the transaction, Brøderbund Software and Electronic Arts called off their previously announced merger. Brøderbund said it agreed to pay $10 million to EA as a result of the decision not to merge.

Reversals of Fortune Radius, SuperMac, and RasterOps have all announced their first quarterly results of the 1994 calendar year. On quarterly revenues of $43.2 million (up 40 percent from the same quarter last year), Radius's net income was $1.2 million, while SuperMac recorded a net loss of $1.3 million on quarterly revenues of $39.9 million (down 9 percent), and RasterOps posted a loss of $1.1 million on $19.4 million in quarterly revenues (down 23 percent). Last year at this time, Radius was facing a loss of $5.3 million, SuperMac was enjoying a $2.1 million operating profit, and RasterOps had just taken a net loss of $6 million, including restructuring costs of $6.7 million. m

News

EDITED BY TOM MORAN

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Besieged Software Giants Join Forces



JOHN RITTER

Cutthroat marketing competition, unrelenting pressure from Microsoft, and worries about companies' financial strength are causing an unprecedented wave of mergers in the software industry. In March, Adobe, home of PostScript and other publishing products, bought Aldus, the originator of PageMaker, for $525 million. Then Novell, the most successful networking company, acquired WordPerfect for $1.4 billion. Finally, on a smaller scale—for a mere $60 million—the software conglomerate Symantec acquired utility vendor Central Point in April, giving it a near-monopoly on commercial antivirus software. Officially, no one's actually buying anyone else; for tax purposes these are exchanges of stock for "pooling of interests." A casual observer, however, might be forgiven for calling up a mental picture of bigger fish eating smaller fish.

Is there a viable strategy behind these mergers, or is it simply a case of companies huddling together for warmth in the long, cold shadow of Microsoft? According to the companies involved, there are product-line reasons and financial reasons underlying these alliances. For example, Symantec, by merging with Central Point, has effectively swallowed its main utilities competitor. Aldus and Adobe emerge with a product line that covers almost everything that could be considered publishing, from electronic prepress to digital multimedia. The merger covers this field so thoroughly that some products of the new entity (Adobe Illustrator and Aldus FreeHand, Adobe Photoshop and Aldus PhotoStyler) will probably be seen as redundant, and some observers expect PhotoStyler and FreeHand to eventually disappear.

Novell has for years been the dominant force in networking but has been forced to watch program suites such as Microsoft Office and Lotus SmartSuite gobble up increasing shares of the corporate software market. This has left Novell watching from the sidelines as a major software profit center developed, while

also raising software-compatibility issues between NetWare and applications Novell can't control. The Novell-WordPerfect merger, which included licensing of Borland's QuattroPro spreadsheet and Paradox database to fill out Novell's office package, gets a Novell suite on the market that's guaranteed to run under NetWare, but it's both the riskiest and the highest-stakes business move by any of these companies from a product-development standpoint. Although Novell now has networking, E-mail, and a leading word processor that works on a large assortment of platforms, it's not clear that the Borland-derived products will give the suite the tight integration that is Microsoft Office's strong point.

The financial arguments for the mergers can be illustrated from the numbers for Adobe and Aldus. In 1993 Aldus had $206 million in sales and 1100 employees, and Adobe had $313 million in sales and 1000 employees. The merger's aim is probably a firm with at least $500 million in sales and about 1600 employees, a broader product line, and better net income per employee. To survive the price-cutting battles that have become a standard Microsoft tactic, and to please the financial analysts who influence stock prices, the newer set of numbers will be an absolute necessity. Look, in the short term anyway, for higher profits and fewer employees at the firms involved in all three mergers. Symantec's merger announcement, for example, contains a promise to downsize Central Point's operations from 280 to 100 employees, and similar cuts can be expected to follow at the other acquired firms. This round of mergers is likely to mean short-term reorganization of tech support, with free tech support starting to vanish in the face of diminished staffing, and an end to the last few years' price cuts, as bigger vendors buy out their competitors.—CHARLES SEITER



RICHARD RETHEMEYER

HP's LaserJet 4MPlus is a 600-dpi, 12-ppm laser printer designed for small workgroups in mixed environments.

HP Trumpets Faster LaserJet

PRINTS 12 PPM AT 600 DPI

Saying it intends to make 600-dpi printing at 12 ppm a new office standard, Hewlett-Packard has introduced the LaserJet 4MPlus laser printer for the Macintosh. The printer is designed to suit small workgroups in organizations of any size; it switches automatically between printer languages (PostScript Level 2 and HP PCL), I/O ports, and 12 different included network operating systems. Another new feature is dynamic I/O buffering, which means that when the user adds more RAM, the printer allocates more RAM to the print buffer. The printer comes with 6MB of RAM, expandable to 38MB, but that amount requires more-expensive 16MB SIMMs. For fast processing, the 4MPlus uses a 25MHz Intel RISC processor.

For paper handling, HP built in a 250-page paper tray and a 100-sheet multipurpose tray that can hold envelopes and letter-, legal-, and A4-size sheets. HP will offer several paper-handling options, including a duplexer, a 500-sheet paper bin, a 75-envelope feeder, and a 1000-sheet output stacker for those very long memos. The printer complies with the EPA's Energy Star guidelines for saving electricity and has a draft mode that uses less toner.

HP has added a Control Panel Lockout feature, which allows the user to add password protection to the printer. HP expected to ship the 4MPlus by the time you read this, at a suggested list price of $2479. The LaserJet 4MPlus comes with drivers for the Mac and Windows, and HP also introduced the LaserJet 4Plus, a similar printer for DOS machines. The new printers replace the LaserJet 4 and 4M. HP, 800/752-0900.—T.M.

Tech Support's Rising Price

AFTER DIALING, COUNT YOUR FINGERS

Talking to a live technical-support human is getting tougher, or at least more expensive. WordPerfect has announced that it is limiting live, toll-free tech support to six months after purchase for business applications, and three months after purchase for workgroup applications. After that, speaking to a live technician will cost $25 per incident or $2 a minute for business apps and $150 per *continues*



HANK OSUNA

In Brief

Brainstorm to Support AE Customers

With Applied Engineering saying it is out of business, Brainstorm Products announced several assistance programs for AE customers. Brainstorm is offering those users free technical support on AOL and AppleLink. The company said it is also giving users $50 off the list price of a Brainstorm accelerator in trade-in for an AE accelerator card. Brainstorm is also offering a related program for AE dealers. 415/964-2131.

Multimedia Patent Ruled Invalid

The multimedia industry heaved a sigh of relief recently when the U.S. Patent Office overturned a patent on multimedia previously awarded to Compton's NewMedia. However, the Patent Office said it is possible that the patent could be reinstated at a later time.

DayStar Pares Processor Prices

DayStar has announced price cuts on most of its 040 processor upgrade boards. The 40MHz versions of both the Turbo and Value 040 now cost $1149, with 33MHz versions available for $949. All the Turbo and Value 040 upgrades now also ship with a 128K RAM cache. The price for the FastCache Quadra board for the Quadra 700 and 900 was also cut; it is now retailing for $199. 404/967-2077, 800/962-2077.

MultiSync Monitors Get Cheaper

NEC has cut the retail prices of its entire MultiSync monitor line by as much as 19 percent. You can now pick up a 15-inch 3V display for $495 (previously $550). The 21-inch MultiSync 6FGp monitor now sells for $2125, a drop of $410. 708/860-9500, 800/632-4636.

incident for workgroup software. State of the Art, an accounting software company, recently announced that it would provide customers with free tech support for 60 days after registering; the company simultaneously announced a $20-per-10-minutes rate for support after the 60-day period expires. Microsoft continues to offer unlimited live, toll-charge tech support, but antsy customers can now get faster access to techs by paying $39 a year for the Microsoft Plus program, although toll charges still apply. The program includes *Microsoft Plus*, the company's bimonthly customer-support magazine.

Macworld has previously reported on Claris Corporation's policy of unlimited calls for 90 days after the first call, Quark's policy of unlimited calls for 90 days after purchase, and Adobe's system of support credits (see *Conspicuous Consumer*, March 1994). WordPerfect, 801/255-5000, 800/451-5151; State of the Art, 714/753-1222, 800/690-5575; Microsoft, 206/882-8080, 800/426-9400; Claris, 408/727-8227, 800/544-8554; Quark, 303/894-8888, 800/676-4575; Adobe, 415/961-4400, 800/833-6687.

—CAMERON CROTTY

V.34 Upgrade Update

FASTER MODEMS ON THE WAY

With the V.34 (28.8-Kbps) modem standard entering final testing, the upgrade picture is slowly clearing. If you purchase a $599 Hayes Optima 288 V.FC for Macintosh fax modem, the upgrade to V.34 will be about $100. Supra said it expects to offer in September a $69 upgrade to its SupraFaxModem V.FC (estimated street price of $399). Starting December 1, the Supra upgrade price will drop to $49, until February 28, 1995. For either company's upgrade, customers send their units to the factory. Global Village Communication will not detail its plans beyond saying that it will support the V.34 protocol and that there will be an upgrade path for current Global Village customers. Finally, U.S. Robotics said that in June it will offer the V.34 upgrade free of charge to users of its Courier V.Fast Class modem. Currently, the modem supports both the V.32terbo and V.Fast Class protocols. Hayes, 404/441-1617; Supra, 503/967-2400, 800/967-8772; Global Village, 415/390-8200, 800/736-4821; U.S. Robotics, 708/982-5001, 800/342-5877.

—CAMERON CROTTY



ROBERT PERRY

U.S. Robotics will offer free V.34 upgrades for its Courier V.Fast Class modems.

THE AMCOEX INDEX OF USED MAC PRICES

Machine/RAM/Hard Drive	Average Sale Price	Monthly Change
PowerBook 100/4MB/20MB	$700	–$100
PowerBook 140/4MB/40MB	$1000	–$50
PowerBook 180/4MB/80MB	$1800	+$100
PowerBook Duo 230/4MB/80MB	$1100	–$100
Mac Classic/2MB/40MB	$425	$0
Mac SE/30/2MB/40MB	$600	+$25
Mac LC II/4MB/40MB	$500	–$25
Mac IIsi/3MB/40MB	$600	–$25
Mac IIci/4MB/80MB	$900	+$25
Mac IIfx/4MB/80MB	$1100	+$50
Centris 650/8MB/230MB	$1200	–$100
Quadra 900/8MB/160MB	$2300	–$100

Index provided by the American Computer Exchange of Atlanta, Georgia (800/786-0717). It reflects sales during the week of April 20. Configurations include keyboard and exclude monitor and display board for noncompact models.

TREND

Faster, Cheaper Optical Jukeboxes

ENORMOUS STORAGE

The optical-jukebox market may ignite if the on-demand video systems announced by Oracle and Microsoft are successful. Ultimately, jukeboxes will provide much of the permanent storage for vast video libraries. Right now, optical-disk libraries have found a niche among companies that need to archive graphics, sound, and financial data.

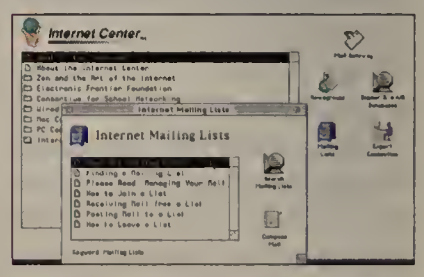
MaxOptix now offers four jukeboxes using its high-speed T3-1304 optical drive. The MaxLyb 6.5, at $6850, puts 6.5GB of storage in a desktop model for individuals and small workgroups. The $9950 MaxLyb 13 minitower and the floor-standing, $10,350 MaxLyb 26 are for small companies or departments. At $28,560, a 52GB model includes two optical drives. The drives support any 5.25-inch standard media up to 1.3GB. DOS/NetWare SCSI kits are available for each model.

The drives compete with Hewlett-Packard's optical jukeboxes. HP uses its own new 1.3GB optical drive, but the MaxLyb products yield better data-transfer rates at lower prices, according to MaxOptix. Both firms offer disk-management software from MacPeak and Software Architects. But HP's line focuses mostly on larger systems: it has 10GB and 20GB models, and then jumps to devices over 40GB. MaxOptix, 408/954-9700; HP, 800/826-4111.—TIM WARNER

AOL's Easy Internet

UNIX BE GONE

The Internet is, as has been widely reported, the world's greatest distributed E-mail system and a rich source of all sorts of information. Since general public interest in the Internet is only a year or so old, most people don't realize that the "native mode" of Internet operations is a fairly cryptic set of Unix commands. Simply trying to read an elec-



AOL's interface to the Internet has had Easy E-mail since February. Access to Usenet newsgroups, the Gopher, and WAIS search utilities are under way.

tronic-mail message at a standard Internet site can be enough to reduce a Macintosh user to tears.

Various vendors are attempting to bring the Internet to the masses via an assortment of national online services, and America Online has taken an early lead in smoothing Internet access for Macintosh users. E-mail is now respectably simple, with plenty of online help—you too can now voice your opinions to president@whitehouse.gov. E-mail, however, is just part of the Internet picture (it's what old-timers call limited access). The next step is the implementation of news filtering, in which a user files a set of keywords and the system flags and forwards the selected news items to the user's file. Finally, AOL proposes to have a real point-and-click interface with full Internet access by summer, enabling users to search remote databases, perform intrasystem file transfers, and log in to remote sites. America Online, 703/448-8700.—CHARLES SEITER



ROBERT PERRY

Quantum's Grand Prix 4280 hard drive stores 4GB of data and has an average access time under 9ms.

Quantum Spins Up 4GB

FAST 3.5-INCH GRAND PRIX HARD DRIVE

Prominent hard drive manufacturer Quantum Corporation has announced two fast, high-capacity 3.5-inch drives: the Grand Prix 2140 and Grand Prix 4280, which store 2GB and 4GB, respectively. Designed for data-hungry applications, such as multimedia, the Grand Prix drives have average seek times of 8.6ms and transfer data at 9.7MB per second, but when the Grand Prix uses a Fast Wide SCSI adapter (not included) the data-transfer rate can reach a blazing 20MBps, according to Quantum. Production quantities of the drives are slated to ship to hard drive vendors in the third quarter. List prices will be set by those vendors, who will integrate the drives into final products ranging from stand-alone devices to RAIDs.—T.M.

Light Utilities

SINGLE-MINDED SOFTWARE

Light Software has announced five utility software products that each do one thing and one thing only. Light Capture ($49) captures screens and saves them in various graphics formats. Light Paint ($79) offers basic and advanced painting tools, including support for Photoshop filters. Light Compress ($49) compresses files and decompresses DiskDoubler, AutoDoubler, and StuffIt files. Light Protect ($49) encrypts and password-protects files and folders. Finally, Light Shredder ($29) permanently erases data for increased security. These utilities require System 7, and many take advantage of recent Apple system enhancements such as QuickDraw GX, Easy Open, and the Drag Manager. All the utilities ship as fat-binary applications (compatible with PowerPC-based and 680X0-based Macs); Light Shredder and Light Capture are currently available from Light Software, while the rest are expected to come out in June. Light Software, 408/253-8721.
—CAMERON CROTTY

BUGS & TURKEYS

SoftKey International's KeyCAD 1.0 thoughtfully provides a predrawn library of PICT images, but if you attempt to check out any of the images, the application crashes. A free upgrade is available from the company by calling 404/428-0008.

OmniPage 3.1 and OmniPage Pro 2.1 optical character recognition applications aren't compatible with the Quadra 800 and 900. Caere says updated versions, OmniPage Pro 5.0 and OmniPage 5.0, will solve this problem and should ship by the end of May. Upgrade pricing was not set at press time.

The AppleCD 300i Plus, Apple's new CD-ROM drive with the autoloading tray, doesn't automatically eject CDs when you shut down or restart your computer. Worse, when the computer has started up again, the CD remains in the Mac but doesn't appear on the Mac's desktop. Pushing the eject button doesn't always help. Apple says to push the eject button when you see the Happy Mac screen during start-up, or stick a paper clip in the emergency eject hole.

Macworld will send you a Bug Report T-shirt if you are the first to inform us of a serious, reproducible bug that we report in this column, or a Turkey Shoot T-Shirt if we shoot your turkey in this space. See *How to Contact Macworld*.

In Brief

More Monitor Price Cuts

Mitsubishi has announced price reductions of up to 27 percent on its flat-square line of monitors. The DiamondScan 15FS now retails for $469 (formerly $645), the 17FS for $1069 (formerly $1299), and the 21FS for $2335 (formerly $2999). Mitsubishi has also announced its Corporate Spares program, which promises to provide a replacement monitor at a qualified customer's location within 48 hours of a reported failure. To qualify, you must purchase 50 or more Mitsubishi monitors during a three-month period. 714/220-2500, 800/828-6372.

Internet in a Box . . .

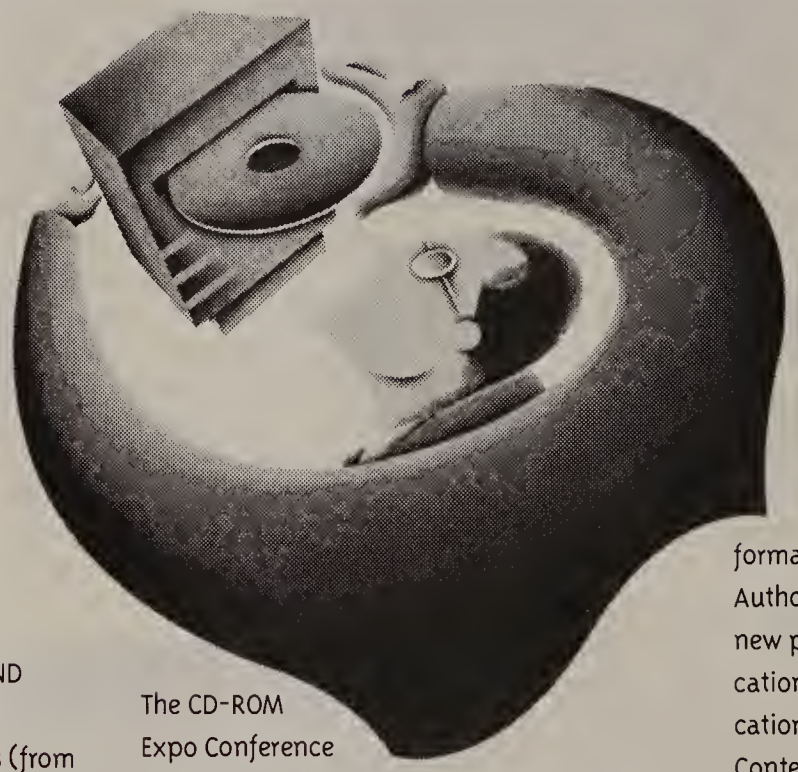
Spry Inc.'s Internet in a Box, a software-and-book combination expected to ship later this year and cost $100, has TCP/IP applications, including tools for FTP (file-transfer protocol), the Gopher file-transfer protocol, Telnet remote log-in software, mail, news, WAIS (Wide Area Information Server), and the Mosaic interface to multiple internet services. The software will act as a client to Internet service providers. The start-up and monthly fees are both $24.95, and the hourly rate is $10.95 at 14.4 Kbps. The package includes *The Whole Internet User's Guide and Catalog*. 206/447-0300.

. . . And Yet More Internet

Another product for simplifying Internet access is Global Network Navigator (GNN). The software sits on top of Mosaic and organizes a variety of Internet resources by category so the user can browse and double-click to get to a particular resource. GNN is made by O'Reilly & Associates, and it's available via FTP by sending E-mail toinfo@gnn.com. Also included with the software is an online version of *The Whole Internet User's Guide and Catalog*. NovX, 206/447-0800.

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MACWORLD

The State of the *Art.*




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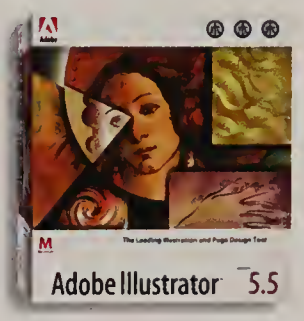
Here's what's going on in our head. Pencil sketch is scanned into Adobe Illustrator. Rainbow color effect ❶ is created with Linear Gradient. Scanned eye ❷ is colorized in Photoshop to simulate a sunglass effect. Grid of green & black in the other lens ❸ is altered with Twirl filter. Circles are added to the bottom of the letter "A" ❹, Pathfinder filter unites them. Letter is imported into Adobe Dimensions™ which adds perspective. Brush stroke ❺ is created with the Calligraphy tool and then painted with multi-color Gradient. The spreadsheet chart ❻ is converted into an Acrobat PDF file and imported. Light bulb glow ❼ is achieved with Shape Blending tool. Punk filter creates spikes ❽ on globe. Entire ad was created and spell checked using Adobe Illustrator 5.5.

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THE STATE *of* the MIND.

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Adobe

Power Mac News

Power Mac Software

THE DELUGE BEGINS

Developers have started to jump on the Power Mac bandwagon, delivering an increasing number of native PowerPC programs. Most programs released for Power Macs are straight ports of the 680X0 versions, offering better performance than on Quadras but no additional PowerPC-specific features.

• Ashlar's $2995 Vellum 3D 2.5 drafting program. Upgrades from the 680X0 versions cost about $10. 408/746-1800.

• BAGH Technologies' $4495 Architrion II 5.8 CAD program. Upgrades from version 5.7 $95; from previous versions $695. 514/273-0522.

• Canto Software's Cumulus image-database system and Cirrus's image-manipulation software. Prices vary. 415/431-6871.

• DeltaPoint's $195 DeltaGraph Pro 3. Upgrades from the 680X0 version 3 $29.95, from previous versions $79.95. 408/648-4000.

• FWB's $199 Hard Disk ToolKit 1.5, which supports SCSI Manager 4.3. Upgrades from any version $29. 415/474-8055.

• Trillium Research's $590 Remus 1.2 drive-array–management software, which supports SCSI Manager 4.3. Free upgrades from version 1.1. 715/381-1900.

• Netherlands-based Trio Systems Europe's C-Index Pro database engine. $495 for single users and $795 for the developers' edition. Free upgrades from C-Index+ 4.0. 31 20 638-6507.



HANK OSUNA

• usrEZ Software's $239 ultraSecure 3.0 security software. Free upgrades from version 1.5 or later. 714/756-5140.—GALEN GRUMAN

Power Mac Slowdowns

OLD SOFTWARE IS CAUSE

Early adopters of the Power Macs are reporting slower-than-expected performance in some cases.

Users of Adobe Type Manager have reported noticeable speed degradation, which Macworld Lab tests confirm. Like many system extensions, ATM replaces some native System 7 code with 680X0 code, which slows performance of even native software. (A PowerPC version is under development.)

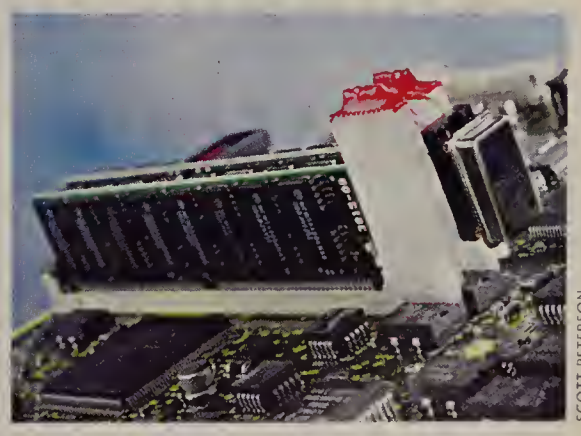
Apple says that slowdown is often not noticeable unless you have many extensions—10 or 20—installed, or unless you use extensions that run continuously. The $79.95 Conflict Catcher 2.1 from Casady & Greene (408/484-9228) can detect extensions that patch native code with 680X0 code.

Some Power Mac owners will see a performance slowdown when working with some high-end video cards or NuBus-based RAID drive systems. Vendors say that the amount of slowdown could be anywhere from a few percent to 20 percent.

However, most users will not notice the slower performance, since their data-transfer rate is not high enough for the 680X0 emulation to affect performance.

People displaying full-motion video or moving very large files across a high-speed disk array may notice a slowdown. Vendors expect to release new native PowerPC drivers and ROMs within the next few months to correct the slowdown.

The Power Mac 7100 also has a bus-timing problem that causes it to read data from SCSI drives more slowly than it writes—the opposite of how drives normally work. However, very few users will notice performance difference, since the 7100's write speeds are still faster than most peripherals'. —CHARLES SEITER, TIM WARNER, AND GALEN GRUMAN



SCOTT PETERSON

By attaching this $165 device to your 6100's motherboard, you get a faster system.

Power Mac Boosters

EVEN FASTER SYSTEMS

To bolster the Power Macs' speedy hardware, several companies now offer accelerated peripherals.

• KS Labs offers a clip-on CPU-clock booster for the Power Mac 6100/60 that makes its CPU run at 80MHz, rivaling the speed of an 8100/80. The Alacrity kit costs $165. 614/374-5665.

• Mobius Technologies plans a set of cache cards, to be available in a 256K version for $199 by May, a 512K version for $299 by June, and a 1MB version for $499 by July. 510/654-0556.

• New Video Corporation has shipped its EyeQ digital video-compression board with native Power Mac drivers, allowing 30-frames-per-second full-frame captures. The board costs $1895; the Power Mac software is free to current customers. 310/449-7000.

• RasterOps Corporation has software upgrades to make its 24-bit video-display cards and video-editing cards work in accelerated mode. Upgrades for the Horizon 24, PaintBoard Professional, and MoviePak series are free from RasterOps' BBS (801/785-5783). Upgrades for the PaintBoard Turbo and PaintBoard Turbo XL cost $49 and will be available by July. Owners of RasterOps 20/20 and 20T monitors will also need a $49 cable adapter to use them with the Power Macs. 801/785-5750.—GALEN GRUMAN



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Circle 69 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

by Cameron Crotty

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY *MACWORLD*. UNLESS OTHERWISE STATED, THE MINIMUM REQUIREMENTS FOR OPERATION ARE A MAC PLUS, WITH 1MB OF RAM, RUNNING SYSTEM 6. ALL INFORMATION AND PERFORMANCE CLAIMS ARE SUPPLIED BY THE PRODUCT VENDOR AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY *MACWORLD*. ALL PRICES ARE SUGGESTED RETAIL. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY.

HARDWARE

ELF-20M and ELF-20PB Floptical Disk Drives

Here's a way to take your storage on the road. This SCSI floptical drive is only 35mm high, and it stores up to 20.8MB on 3.5-inch floptical discs. The drive can also read and write standard Mac high-density floppy disks (1.4MB), as well as PC-compatible 1.44MB and 720K floppy disks. The drive's average seek time is 65ms. The ELF-20M is for desktop Macs, while the ELF-20PB works with PowerBooks. ELF-20M $450; ELF-20PB $475. ASDOR (Advance Storage Device Corp.), 602/966-8200, 800/726-4622; fax 602/966-5166.

ELO-128M and ELO-128PB Rewritable Optical Drives

This drive uses 3.5-inch removable optical cartridges and can fit up to 128MB on a single cartridge. The low-profile (35mm-high) drive features an average seek time of 30ms and a SCSI-2 interface. The ELO-128M is for desktop Macs, while the ELO-128PB works with PowerBooks. ELO-128M $975; ELO-128PB $999. ASDOR, 602/966-8200, 800/726-4622; fax 602/966-5166.



ELO-128M

ELQ-105M and ELQ-105PB Removable Cartridge Drives

Based on a SyQuest mechanism, this removable-cartridge hard drive can store up to 105MB on one 3.5-inch cartridge. The low-profile drive (35mm-high) features a SCSI-2 interface and an average seek time of 14.5ms. The ELQ-105M is for desktop Macs, while the ELQ-105PB works with PowerBooks. ELQ-105M $599; ELQ-105PB $625. ASDOR, 602/966-8200, 800/726-4622; fax 602/966-5166.

F/25X

Digital Eclipse's card replaces the original CPU/ROM daughtercard in the PowerBook 140 and 145 and can be installed by any qualified technician. The upgrade increases CPU speed to 25MHz and includes an FPU. Customers must return their old daughtercards to the company. A 33MHz version of the card, the F/33X, is also available for the PowerBook 160 and 165. F/25X $379; F/33X $399. Digital Eclipse Software, 510/547-6101, 800/289-3374; fax 510/547-6104.

Infinity 200 Turbo

A 5.25-inch, 200MB removable SyQuest hard drive that features a SCSI-2 interface and is fully read-write–compatible with 44MB and 88MB cartridges. The average access time on this half-height drive is 27ms, and it ships with a single 200MB cartridge. Internal $667; external $775. PLI (Peripheral Land Inc.), 510/657-2211, 800/288-8754; fax 510/683-9713.

Infinity 270 Turbo

Based on a SyQuest drive mechanism, this SCSI-2 removable-media hard drive fits up to 270MB on a single 3.5-inch cartridge and features an average access time of 23ms. The drive is also backward-compatible with SyQuest 3.5-inch 105MB cartridges and ships with a 270MB cartridge. Internal $599; external $651. PLI, 510/657-2211, 800/288-8754; fax 510/683-9713.

Infinity Optical 1.3GB SL

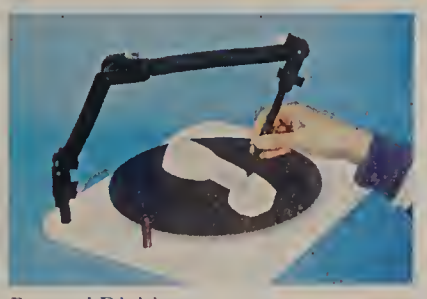
This half-height, SCSI-2 optical drive uses 5.25-inch cartridges and fits up to 1.3GB on each one. The drive features an average access time of 70ms and can read from and write to 650MB optical cartridges. The half-height chassis fits in Quadra 900, 800, and 650-series Macs, and the drive ships with a single cartridge. Internal $3413; external $3599. PLI, 510/657-2211, 800/288-8754; fax 510/683-9713.

IntelliTouch Model P284-MAC14

Integrated with a 14-inch Apple Macintosh Color Display (Trinitron, 0.26mm aperture pitch), this touch screen provides a resolution of 900 points per square inch. According to the manufacturer, the acoustic-wave technology used is drift-free, eliminating the recalibration required by some other touch technologies. The touch monitor is available with an ADB port for the touch data, and the product ships with the company's MonitorMouse mouse-emulation software. $1620. Elo TouchSystems, 615/482-4100, 800/356-8682; fax 615/482-6617.

Multigraph 447X

A multiple-resolution (autosyncing) color monitor that displays up to 1600 by 1200 pixels at a 60Hz vertical refresh rate. The Trinitron-based Multigraph features a 0.26mm aperture pitch, and displays the more common 1280-by-1024-pixel resolution at 75Hz. Users can adjust the monitor with on-screen controls such as brightness, contrast, color temperature, focus, pincushion, and convergence. The Multigraph 447X complies with both the MPR II and Energy Star guidelines. $1250. Nokia Display Products, 415/331-0322, 800/296-6542; fax 415/331-6211.



Personal Digitizer

Personal Digitizer

Instead of creating three-dimensional objects with an input device that only works in two dimensions, you might try this three-dimensional digitizer. The Personal Digitizer consists of a stylus attached to a jointed arm; sensors embedded in the joints report the position and orientation of the stylus at resolutions as high as 3600 points per square inch (down to 15/1000 inch). The



Multigraph 447X

device connects to the serial port of your Mac, and driver software is included, as well as a basic digitizing package. $1595. Immersion Corp., 415/960-6882; fax 415/960-6977.

PortaView

This portable video-to-TV converter is 6 inches long and lets any Macintosh with a video-out port send an NTSC composite or S-Video signal. The device requires an AC adapter, which is included. $195.79. Portable Peripherals Specialists, 206/633-5876; fax 206/633-5876.

SiliconExpress IV

If your SCSI port feels like an eyedropper, but you need a big, fat data hose, you might consider this 16-bit SCSI-2 (Fast and Wide) accelerator on a 7-inch NuBus card. The SiliconExpress IV supports sustained transfer rates of 20 MBps and SCSI chains of up to 15 separate IDs. The card also supports Logical Unit Numbers and selectable SCSI IDs. This last feature means that two Macs, each equipped with one of these cards, can share a single SCSI peripheral. $1295. Atto Technology, 716/691-1999; fax 716/691-9353.

Spectra Star GTx and GLx

Two PostScript Level 2, thermal-wax color printers with true resolutions of 600 by 300 dpi. The GTx comes with 10MB of RAM (expandable to 32MB) and 52 fonts. Users can also expand the printer with plug-in cartridges; a 120MB hard drive is one example. The GLx comes with 8MB of RAM (expandable to 24MB) and 52 fonts, and cannot be expanded via cartridges. Both printers feature simultaneously active parallel, serial, and AppleTalk ports, and they can automatically switch among all three. GTx $4995; GLx $3795. General Parametrics Corp., 510/524-3950, 800/223-0999; fax 510/524-9954.

continues



Super 17S

Super 17S
This 17-inch multiple-resolution color monitor features a 0.26mm dot pitch and flat-square tube design. The display automatically syncs to many standard graphics resolutions up to a maximum of 1280 by 1024 pixels at 60Hz. The Super 17S is compliant with both MPR II and Energy Star guidelines. $895. NSA, 617/461-8300, 800/441-4832; fax 617/461-8664.

SupraFaxModem 288PB
This internal PowerBook fax modem uses the V.FC standard to provide 28.8-Kbps data communications. The 288PB also supports V.32bis and V.32 protocols, plus V.42bis data compression and MNP Classes 1 through 5. The fax side can transmit and receive at 14.4 Kbps, and is Group III–compliant. The fax modem ships with Microphone LT, CompuServe Information Manager, CCL scripts for Apple Remote Access, and PSI's Faxcilitate fax software. $299. Supra Corp., 503/967-2400, 800/967-8772; fax 503/967-2401.

Troll Touch PB
To install this touch-screen system for the PowerBook, Troll Technology fits your PowerBook with a touch screen that is made of clear, pressure-sensitive layers of polyester. The company also attaches to the lid of the PowerBook an external controller box that plugs into the ADB port (the box has an ADB port, so you can still use input devices). Once it is installed, the touch screen has a resolution of 4096 by 4096 points. The installation price includes the company's Touchstar mouse-emulation software. Models are available for the PowerBook 165, 165c, 170, 180, and 180c. $695. Troll Technology, 805/295-0770; fax 805/295-0771.



Troll Touch PB

TV Gamer Plus
It sounds like an add-on for your Nintendo system, but it's actually a signal converter that translates your Mac's video output into NTSC composite video that a VCR or television can understand. The product is compatible with any Mac that has a standard DB-15 video-out port. $219. SIIG, 510/657-8688; fax 510/657-5962.

SOFTWARE

Advise
Send messages directly from your Mac to any alphanumeric pager with this software and your modem. After you type in your message, the software dials a pager number directly—you don't have to dictate your message to an operator. The software stores a list of up to 50 frequently used numbers. $39.99. Motorola, 407/364-2000; fax 407/364-2341.

Artrageous: Beyond the Border
When you've got a document that you need to fence in, you can choose from 100 color EPS border images in this package. Each border can be ungrouped, and there are 500 individual art elements. You can create borders made up of tiny images of animals, plants, books, and musical instruments, or you can choose from abstract patterns. $79.95. Metro ImageBase, 818/881-1997, 800/525-1552; fax 818/881-4557.

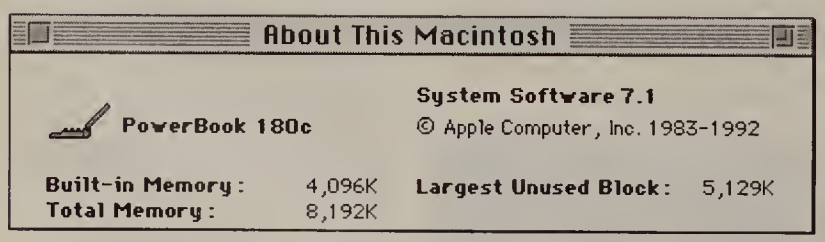
Bar Code Labeler II
We're not talking about secret handshakes in a saloon (think about it)—we're talking about software that helps you create and edit bar codes in Code 3 of 9, Interleaved 2 of 5, Code 128, Code 93, UPC (A and E), EAN (8 and 13), and Codabar symbologies. Bar Code Labeler II features graphics, text, full positional control over your codes, user-definable layouts, and the ability to print sequential and repeating bar codes. $149. Videx, 503/758-0521; fax 503/752-5285.

Bookends Pro
Bibliography-management software that could help you spend less time fooling with your footnote format and more time refining your work. Once a work is complete, Bookends Pro searches it, formatting footnotes and creating a bibliography from its database of sources. Users can import reference information from online database services and text files, or type in references directly. The software includes more than 90 predefined reference/footnote formats, including most professional journal specifications; users can also create their own settings. 2MB min. memory; requires Mac SE. $149. Westing Software, 415/435-9343, 800/325-1862; fax 415/435-6286.

Communicate Lite
Beginners will like the topical help, Balloon Help, and tool bar in this telecommunications package. Advanced users will appreciate the fact that Communicate Lite uses the Apple Communications Toolbox, so they can easily add more tools and protocols. The software has an automatic log-in capability and an address book. It also supports multiple simultaneous sessions, treating each session as a separate document. Communicate Lite ships with the company's Zmodem tool for the Apple Communications Toolbox. Requires System 7.
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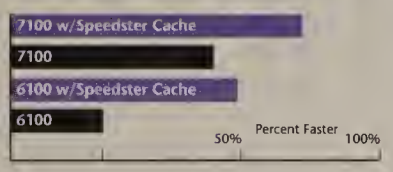
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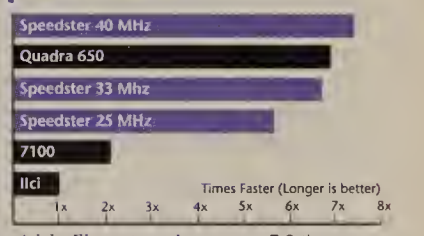
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Media Management Tools
This set of three utilities can help you keep a handle on those growing piles of network volumes, floppy disks, and other removable media. VirtualDisk runs in the background under System 7 and maintains a running catalog of volumes that you mount on your desktop. EasyLabels creates labels that show a disk's name and contents, and it can print them out in several Avery-label formats. EasyLabels can also print labels based on VirtualDisk catalogs. With DiskDup+, users can make copies from Macintosh or DOS-format floppy disks, as well as from Apple Disk Copy images. Requires System 7. $79. Continuum Software, 206/695-8136, 800/ 603-7446; fax 206/260-2804.

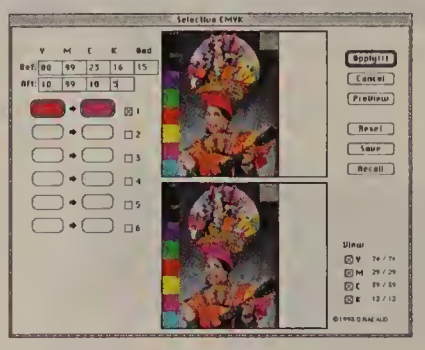
Microphone LT
Before, the only way to get this software package was to buy a modem, but now this stripped-down version of Software Venture's Microphone communications software is available as a standalone product. Microphone LT emulates a range of VT terminal protocols, plus Wyse 50 and PC ANSI, and also supports several file-transfer protocols, including Zmodem. The program also incorporates Loran, a graphical front end for several popular information services, including CompuServe, GEnie, and MCI Mail. A comprehensive manual guides beginners from basic hardware principles to dialing up another computer. $49.95. Software Ventures Corp., 510/644-3232; fax 510/848-0885.

MxdLibrarian
Cataloging software for both computer files and nonelectronic media, MxdLibrarian automatically logs files from both local and networked volumes. The software displays thumbnail images for QuickTime movies and PICT files; You can also preview QuickTime movies and sound resource files within the application. MxdLibrarian is also designed to track noncomputer source materials, including audiotapes and videotapes, audio CDs, records, magazines, books, and slides. Entries can be searched by multiple criteria, including name, subject, item type, and text in the comments field. 7.5MB min. memory; requires System 7. $129. MxdMedia Systems, 205/533-2637; fax 205/534-6473.

Oxyd magnum
With many new game elements and 100 new landscapes, you'll have your hands full trying to finish this sequel without losing your marbles. Players roll around playing fields that are littered with one-way turnstiles, sensors, trigger plates, and traps. The object is to uncover like-colored Oxyds in sequence, thus pairing them up and forcing them to remain open. $59.95. Dongleware Publishing, 617/497-1130, 800/228-6993; fax 617/497-1130.



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Second Sight 3.0

Second Sight 3.0
Interested in setting up your own little information cul-de-sac? The latest version of this BBS software features true multiline support, full ANSI color and graphics, Zmodem batch downloading (an online batch-file editor is included), and improved sysop tools for file and message management. Sysops can further customize their BBSs with the included scripting language. $199. FreeSoft, 412/846-2700; fax 412/847-4436.

Select
An Adobe Photoshop plug-in that lets you color-correct CMYK files by adjusting four graphs (one for each color) while you watch the effect on your image. You can add up to 100 points on each curve, move curves simultaneously, and save sets of curves for later use. You can also do what the manufacturer calls local or selective color correction. You select a color (or set of colors) from your image using the eyedropper tool. Then you choose a destination color, and Select moves the image color toward the destination color. You control how much the image color changes, as well as how other, similar colors react. Requires Adobe Photoshop 2.0. $245. Human Software, 408/741-5101; fax 408/741-5102.

Smart Automotive Manager III
Managing an automotive garage doesn't have to be a pain in the oil pan. This software tracks inventory, handles estimates and repair orders, keeps track of clients' vehicles and scheduled maintenance, and shows approximate cost and profit on a job while an estimate is being calculated. Mechanics can create job codes for easy entry of popular services, and they can retrieve customer records by name or license-plate number. Additionally, the software can create service reminders, thank-you notes, form letters, postcards, and other marketing tools. $1995. Integra Management Systems, 707/833-1823; fax 707/833-2596.

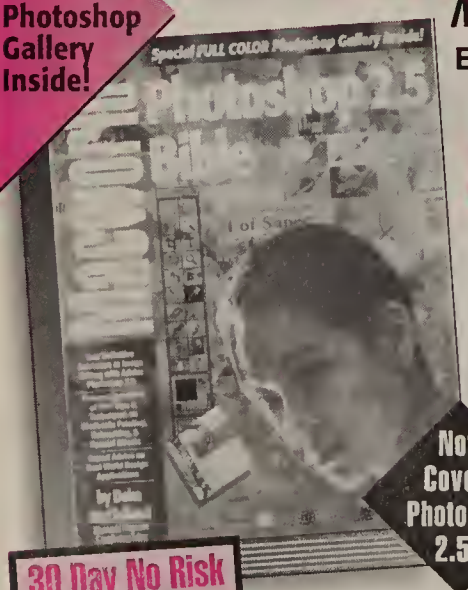
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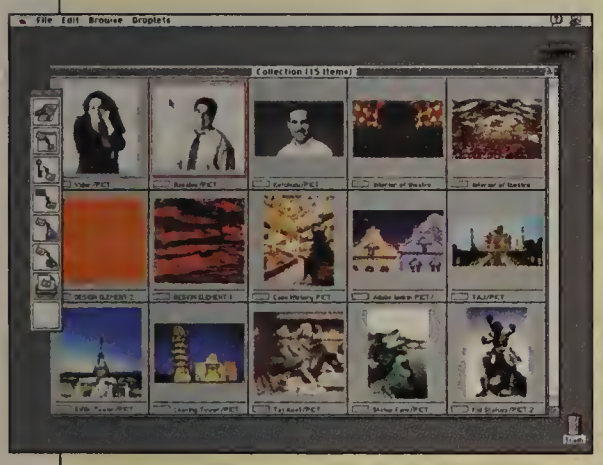
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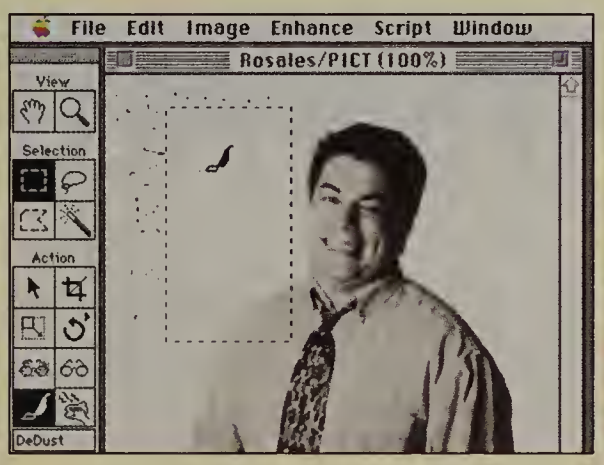
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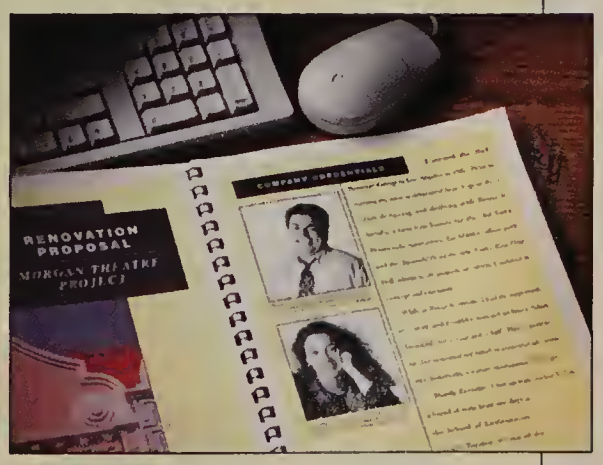
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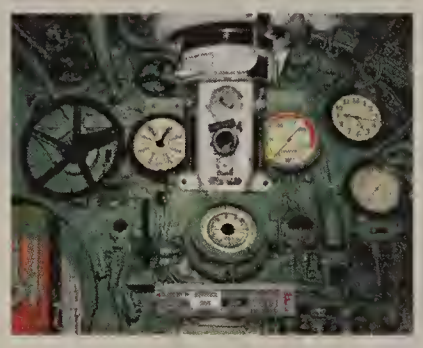
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text editor that supports quoting, word wrap, and removal of line-breaks. Smartcom II 4.0 also automatically detects Hayes-compatible modems that support the I4 AT command, and it configures itself for optimum use with those modems. The software allows users to create buttons to perform scripts and macros, and it supports PowerTalk and Apple events. $149. Hayes Microcomputer Products, 404/441-9200; fax 404/441-1213.

StyleScript
Owners of the Apple Color StyleWriter Pro can now produce Adobe PostScript Level 2 output. With this driver, your Macintosh performs the rasterization that's normally handled by a raster image processor (RIP) in a PostScript printer. StyleScript provides color calibration and a LaserWriter-like interface. The software also supports Apple's PrintMonitor, and ships with 13 PostScript Type 1 fonts. 8MB min. memory; requires Macintosh Classic, System 7. $149. GDT Softworks, 604/291-9121, 800/663-6222; fax 604/291-9689.

TurboCAD for Macintosh
Creating high-precision blueprints is the mission of this computer-assisted-design package. The software features context-sensitive prompts that inform the user about what sort of input the package expects next, easing the learning curve. All features are accessible from floating palettes, and a special Snap palette offers tools for snapping to endpoints, midpoints, and tangents of objects. $149. IMSI, 415/454-7101, 800/833-8082; fax 415/454-8901.

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All ahead, flank speed. This re-creation of a World War II submarine in the North Atlantic will have you fighting the Allies from the outbreak of the war until mid-1940. A real-time simulation, the game features digitized sounds and voices, and screens that are as realistic as possible—down to the condensation in the control room. Just watch out for depth charges. 4MB min. memory; requires SE/30 and 16 colors or gray scale. $59.95. Deadly/Games, 516/482-4000; fax 516/482-4057.



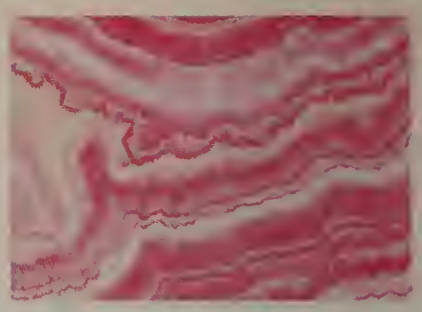
U-Boat

Wildlife-Accents
A clip-art volume with an environmental feel, this collection of 50 color images (black-and-white versions are also included) features both animals and plants. The package also includes Wildbits, a 144-character pictographic font. In Wildbits, each image of an animal from the Wildlife-Accents volume illustrates its corresponding letter of the alphabet (for example, *D* for dolphin). Wildlife-Accents is available in EPS, PICT, and TIFF formats; Wildbits is available either as an Adobe PostScript Type 1 or TrueType font. $69. Arro International, 201/746-9620, 800/243-1515, ext. 485; fax 201/509-0728.

CD-ROMS

Assorted Images Volume 1
Give your documents a nineteenth-century feel with this collection of wood-engraving images. The disc contains more than 1000 images in 30 categories, including animals, plants, people, and tools. All files are in EPS format. $79.95. Harter Image Archives, 210/490-0321; fax 210/490-0738.

Critical Path
A 24-year-old chopper pilot named Kat is being pursued through a factory by a gang of thugs and an insane generalissimo with a penchant for high explosives. You must talk Kat through 15 rooms and halls filled with tricks and traps before she can hop into a waiting helicopter to freedom. You'd better not take too long with your decisions, either, or Kat is liable to get impatient and strike out on her own. This action-and-adventure game features live video with human actors in animated landscapes. $79.95. Media Vision, 510/770-8600, 800/348-7116; fax 510/252-4499.

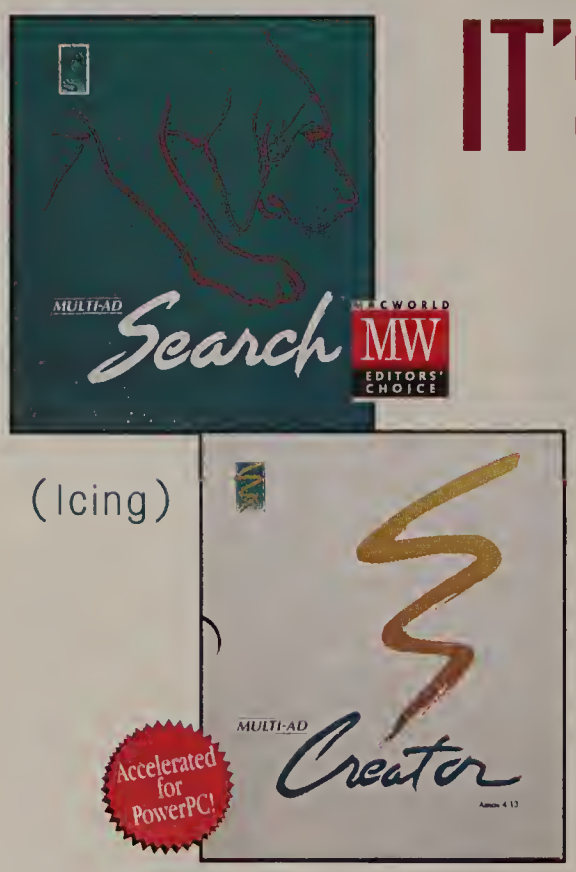


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Picture Factory
A library of over 2500 royalty-free, 24-bit, 640-by-480-pixel–resolution stock photographs. Categories include scenic views, space, leisure, business, people, backgrounds, animals, and food. The disc ships with browsing software that allows keyword searches on multiple criteria. 4MB min. memory; requires 8-bit color. $49.95. Photodex, 510/449-9079; fax 510/449-3519.

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ACCESSORIES

Flightstick Pro and Jetstick
Check six, sky pilot. The Flightstick Pro is a four-button ADB joystick that helps you get a handle on those electronic bogies and bandits. The buttons are all programmable (software included), and there is a programmable four-way switch. Users can load different button settings for different applications. The Jetstick is a two-button, jet-style joystick that also connects to the ADB port. Flightstick Pro $129.95; Jetstick $74.95. CH Products, 619/598-2518, 800/624-5804; fax 619/ 598-2524.



PC-7 Multimedia Video Camera

PC-7 Multimedia Video Camera
Maxwell Smart could probably fit one of these color video cameras into his jacket pocket. The PC-7 outputs NTSC composite video at 350 lines of horizontal resolution, as well as line-level, monophonic audio from a built-in microphone. The camera has automatic white-balance and exposure functions, and is fitted with an f1.8, 4.44mm lens (78-degree field of view). An (included) external power supply is required. $349.95. Advanced Microvideo, 512/335-2200; fax 512/335-1925.

BOOKS

Adobe Illustrator 5.0: The Official Handbook for Designers
Authors Tony Bove and Cheryl Rhodes guide readers through professional designers' artwork, using the artists' words to explain how the special effects and designs were created. Readers learn how to work with Illustrator's interactive dialog boxes, how to get the most out of plug-in filters, how to draw with multiple layers, and how to work with color type, images, and separations. 455 pages. $27. Random House Electronic Publishing, 212/572-2600, 800/733-3000; fax 212/572-4997.



The Internet Yellow Pages

The Internet Yellow Pages
Applying the format of the telephone yellow pages to the Internet, authors Harley Hahn and Rick Stout provide over 2400 listings in 155 categories of Internet services, features, and resources. *The Internet Yellow Pages* includes definitions of the topics listed, as well as hints on accessing the posted information. The book also has an annotated list of Usenet newsgroups. 447 pages. $27.95. Osborne/ McGraw-Hill, 415/549-6600, 800/227-0900; fax 415/549-6603.

Newton's Law: The Digital Nomad's Guide
According to authors Andrew Gore and Mitch Ratcliffe, Newton handwriting recognition is "not the Chevy Chase Show of input technologies, as some would have you believe." They then go on to explain how to improve your Newton's recognition rate. They also explain the PDA's hardware and software, describing how to create reports, memos, and letters; how to send faxes; and how to send and receive E-mail. 458 pages. $24. Random House Electronic Publishing, 212/572-2600, 800/733-3000; fax 212/572-4997.

Real World PageMaker 5.0
Subtitled *Industrial Strength Techniques*, this book covers such topics as getting the most out of PageMaker 5.0's enhanced Control Palette, creating custom color libraries, using Additions, and trapping spot colors. The authors (Bruce Fraser, Olav Martin Kvern, and *Macworld* contributing editor Stephen Roth) also give tips on workgroup publishing, PostScript, and database publishing with OLE. 512 pages. $28. Random House Electronic Publishing, 212/572-2600, 800/733-3000; fax 212/572-4997.



Real World PageMaker 5.0

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.

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Circle 26 on reader service card

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Mark Kvammc is President & CEO of CKS Partners, Inc., a full-service advertising and marketing communications company with offices in Silicon Valley, San Francisco, Portland and London. CKS' stellar achievements include the redesign of United Airlines' corporate identity system and the merchandising system for the Apple Newton launch. Given their total commitment to Macintosh® technology, it's not surprising that CKS was one of the first to get Radius' new LeMansGT graphics accelerator card.

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Circle 14 on reader service card

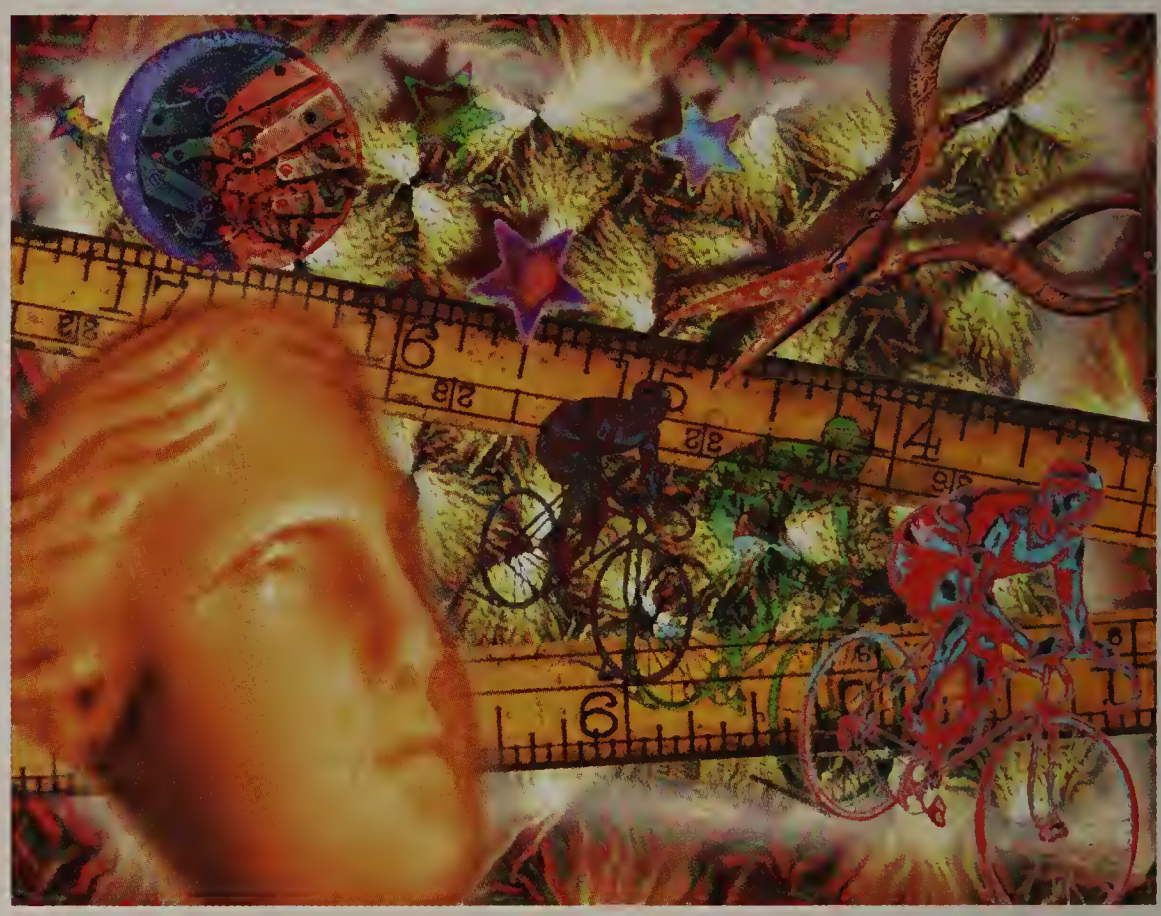
Reviews

Collage 1.0.1

Image-Compositing Software

PROS: Precision editing controls; proxies allow you to reverse operations without image deterioration; resolution-independent rendering. **CONS:** No CMYK support; no means for creating masks inside Collage; slow screen redraw with no interrupt option. **COMPANY:** Specular International (413/253-3100). **LIST PRICE:** $349.

MW ★★★



DIANE FENSTER

SPECULAR INTERNATIONAL'S COLlage allows you to combine and composite multiple RGB images stored in PICT, TIFF, and Photoshop 2.5 formats. Unlike the Mac's most popular image editor, Adobe Photoshop, Collage does not let you edit the pixels inside an image (except via filters). Instead, it treats each image as an independent object; you can position, transform, and layer images, as you can with object-oriented applications such as Adobe Illustrator and Aldus FreeHand. You can also mix images by applying overlay modes, and mask an image using its alpha channel.

Images as Objects

Collage's interface is similar to that of desktop publishing programs such as Aldus PageMaker and QuarkXPress. Much like a desktop publishing program, Collage lets you import raw materials created and edited in other programs and combine them to form a final document. For precision work, Collage offers rulers and snap-to guides, as well as functions that nudge, group, align, lock, and hide images. The program even provides a page boundary and a pasteboard, enabling you to establish bleeds and temporarily set aside extraneous images.

The crowning touch is a floating palette that displays the size of an image, the transformations applied to it, and the numerical results of various other operations. If you don't like an effect, you can remove it by simply entering a different value in the palette (see "The Privileges of Proxies").

Operations can be easily reversed because they are never applied to the original image. When you import an image, Collage creates a 72-dots-per-inch proxy file that represents the image throughout the editing cycle. Like a stuntman in a movie, the proxy takes a beating so the original image doesn't have to. In fact, Collage doesn't bother to revisit the original image until you render the finished composition.

The names of all imported images appear in a scrolling list. Strangely, before you can view an image inside the page area, you have to drag it from the list and drop it onto the page. But this extra step can be forgiven thanks to an otherwise straightforward interface. The first image in the list is the frontmost image in the file; the last is the rearmost. You can change the layers' order by dragging image names in the list or by selecting an image and choosing traditional layering commands (Bring to Front, Send to Back, for example). Much to Collage's credit, you can use it without once referring to the manual.

You can print composite images from Collage, but you can't print color separations. You have to render your image to disk and print color separations from another application, such as Photoshop. As in a three-dimensional drawing program, Collage lets you render your composition at any size and resolution you desire. For example, if you intend to send

a proof to a client by E-mail, you can render the image at a low resolution, just large enough to see important details. After implementing your client's changes, you can rerender the file at a high resolution, then open the rendering in Photoshop, make any last-minute color corrections, and output the composition to CMYK separations.

Masks and Effects

All three of the file formats that Collage supports—PICT, TIFF, and Photoshop 2.5—store at least four color channels. Since Collage can't open CMYK images, each of your RGB files can include an additional alpha channel, which Collage interprets as a mask. In fact, masks are the only method for defining selection outlines in Collage, so there's no reason *not* to include alpha-channel data with each image.

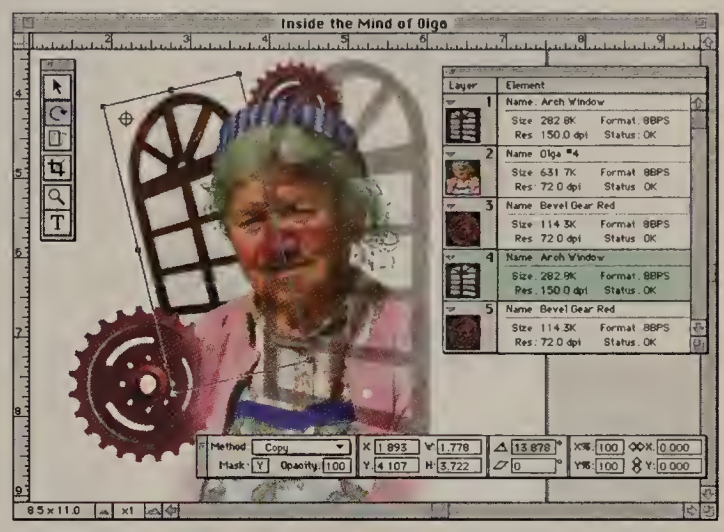
The problem with the alpha-channel approach becomes increasingly evident as you use the program. While Collage supplies a feathering option for blurring the masked area, the program offers no means for defining alpha channels. As a result, you have to create and edit your mask in the file's original application. Collage doesn't even offer traditional selection tools such as a lasso tool or magic wand, so there's no means to select different areas and, say, apply one filter to the first half of an image and another filter to the second half. In fact, the only way that you can combine effects is to import two versions of the image to Collage with separate masks and overlay them. Obviously, it's a whole lot easier to filter your images before importing them into Collage.

While filters are a bust, compositing is Collage's strength. As in Photoshop, you can change the opacity of a floating image to make it translucent. You can also apply a wide range of overlay modes, including modes that are not currently available in Photoshop except via full-blown channel operations (see "Composite Controls"). For fans of drop shadows, Collage automatically creates shadows of a specified color, offset, and fuzziness. And as with all of Collage's functions, if you don't like the way a drop shadow or overlay mode looks three years from now, you can change the effect as easily as selecting a different option.

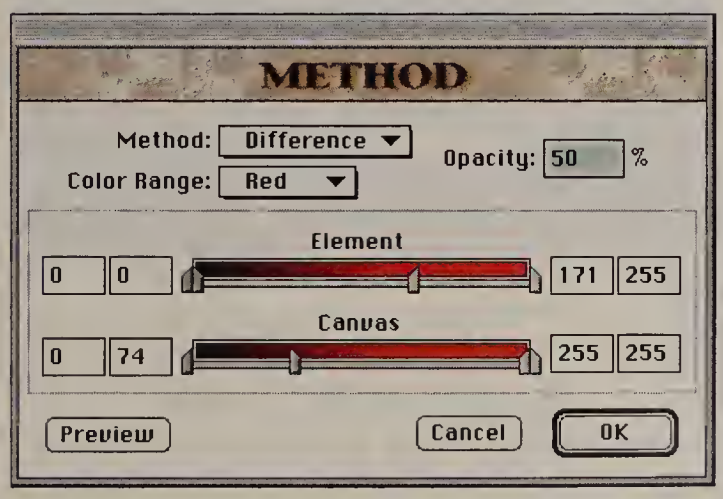
The Slow Pace of Progress

But while Collage is functional and indisputably easy to use, it's unlikely to take the digital-imaging world by storm. Like many first-version products, its oversights are nearly as numerous as its benefits. For starters, it's slow. Even taking into account version 1.0.1's enhanced collection of display qualities, Collage frequently takes longer to apply transformations to its low-resolution proxy files than Photoshop takes to apply similar changes to the real images. This problem would be partially alleviated if Collage provided any means to interrupt the screen redraw, but you can neither cancel the redraw nor choose a command nor select a tool until the redraw has finished. So you sit around and wait a lot.

But speed isn't the only problem. When you move an image, Collage shows only a rectangular bounding box, making it impossible to correctly line up proxies the first time and necessitating a lot of time-consuming nudging with the arrow keys. When you replace an image by reapplying the Import command, Collage forgets all settings previously applied to that image, including any transformations, filters, or overlay modes that you may have applied. As you can imagine, this makes it even more laborious to touch up images in Photoshop on the fly or make adjustments to alpha channels. You will definitely want to make sure you're finished working on an image before you import it into Collage. Among the other deficiencies, you can't undo the importing of an image; the Open dialog box lacks previews; you can't change the page size after creating a new document; and there's no grabber hand, so you must do all scrolling with the scroll bars. A little planning would have gone a long way toward eliminating those distractions.



The Privileges of Proxies When I rotate a proxy, Collage tracks the rotation in the information palette. (Here the rotation value—13.878°—appears highlighted in green.) To undo the rotation, all I have to do is enter a value of 0°. And unlike in Photoshop, rotations and reversions have no deteriorating effect on the quality of the original image, no matter how many times you apply the transformation.



Composite Controls Users of Photoshop will recognize the options in Collage's Method dialog box, which is nearly identical to Photoshop's Composite Controls dialog. The primary difference is that Collage offers three overlay modes from the pop-up menu—Add, Subtract, and Difference—that Photoshop makes available only as channel operations.

But Who Needs It?

Specular International designed Collage as a companion product for Photoshop, and thus far, Adobe seems to have embraced it with open arms. In fact, I've talked to several members of Adobe's technical-support staff who are nearly as familiar with the program as they are with their own. And if anyone should mention the *L* word (HSC's forthcoming Live Picture), Adobe points to Collage as its short-term answer. But the question remains: What with Fractal Design's Painter X2 having months ago introduced much of Collage's functionality, and the threat of Live Picture looming on the horizon, might not Adobe integrate some of these same functions into a future version of Photoshop, thereby rendering Collage obsolete?

Though only Adobe knows the answer, this seems a likely scenario. So why should you purchase Collage? Despite its problems, it's a sure thing and it's available now. For those of you who frequently composite images from a variety of scanned sources and who are frustrated by Photoshop's lack of flexibility, Collage is a flawed but serviceable tool that will enhance your range of options and enable you to render the final image at a variety of resolutions. If compositing is still just a hobby for you, however, I suggest that you wait to see what kind of improvements the future holds in store for both Collage and Photoshop.

—DEKE McCLELLAND

Apple QuickTake 100 for Macintosh

Digital Camera

PROS: Least expensive color digital camera; lightweight; relatively fast picture processing; Flash EPROM protects images from power failure; delivers immediate results. **CONS:** Heavy compression and interpolation requirements yield lots of artifacts; fixed-focus lens with no zoom option; maximum of eight pictures at full-screen resolution. **COMPANY:** Apple Computer (408/996-1010). **COMPANY'S SUGGESTED PRICE:** $749.

MW ★★★

COMPARED WITH OTHER DIGITAL cameras, Apple's QuickTake 100 for Macintosh is a value leader. The only digital camera to offer color at a price of less than $1000, the QuickTake is lightweight and easy to use, processes pictures quickly enough to take several shots in succession, and stores images in memory so there's less chance of mechanical failure. But when compared with traditional 35mm cameras combined with, say, Photo CD film scanning, the value of the QuickTake 100 slips. Thanks to significant compression and interpolation requirements, the image detail is disappointingly coarse. The camera can take only eight pictures at a time when set to the more passable of the two image resolutions, and it doesn't even have a focus ring or zoom option. After using the camera for two weeks, I thoroughly enjoyed the immediacy of snapping pictures and viewing them on screen minutes later, but I also had plenty of time to mull over the camera's plentiful and obvious deficiencies. All things considered, it's one of the best gadgets of its kind, but it doesn't yet qualify as a practical tool.

Holding Up a Scanner to Real Life

Like desktop scanners, digital cameras use photosensitive chips called charge-coupled devices (CCDs) to convert light into digital signals. More-expensive cameras feature three CCDs—one each for red, green, and blue light. The QuickTake 100, however, relies on a single CCD to capture all colors. Each of the 307,000 pixels on the CCD—that's 640 by 480 pixels, one for every pixel in a digital image—is exclusively sensitive to either red, green, or blue light. This means the QuickTake actually captures only 8 bits (as opposed to 24 bits) of data per pixel. The camera compresses an image and stores it in RAM. When you open an image using the QuickTake software or an image editor such as Adobe Photoshop, the software interpolates the image on the fly from 8-bit to 24-bit color.

The primary advantages of the single-CCD approach are a reduced price—one CCD costs less than three—and speedy picture processing. Whereas many digital cameras take several seconds to process a single image, the QuickTake makes you wait about a second between each picture (assuming you don't need the built-in flash, which takes 7 seconds to recharge). But that's still too long to shoot more than a couple of photos of wildlife or other moving subjects.



TOM GIBSON

Opening your image is another matter. Because the software has to interpolate a photo on the fly, it takes about four times as long to open and decompress a QuickTake image as one compressed with JPEG. The fact that the software has little real color information to work with also presents problems. In continuous-tone areas, the software is able to interpolate with a reasonable degree of accuracy. The inevitable artifacts are nothing beyond what you might associate with medium-quality JPEG compression. But in high-contrast areas, the interpolation is less successful. In a photo of a black letter against a white background, for example, the edges of the letter are fringed with a rainbow of differently colored pixels. This is because the software can't figure out what to do with the medium-luminosity red, green, and blue pixels that are bordered by low-luminosity colors (black) on one side and high-luminosity colors (white) on the other. This deficiency makes the camera particularly ill-suited to product photography.

Point-and-Shoot Architecture

Another reason that product shots should be left to another camera is the QuickTake's fixed-focus lens. A subject must be at least four feet from the camera to appear in focus, so close-ups are out. In fact, optically, the QuickTake 100 has more in common with a $10 disposable camera than with a basic 35mm model. According to Apple, the QuickTake's field of view is equivalent to that of a 35mm camera with a 50mm lens. However, the QuickTake sorely needs a telephoto option; even a single zoom setting would make a world of difference. With a little experience, you become painfully aware that the smaller your subject appears in the viewfinder, the fewer pixels the camera devotes to it. So you spend a lot of time positioning yourself, which can be a real problem when taking action photos.

Photographing at dusk with the Apple QuickTake 100 is another trial. The aperture adjusts automatically from *f*2.8 to *f*16, and the slowest shutter speed is 1/30 second. Once the sun starts setting, this camera needs a flash. Interestingly enough, the QuickTake includes a standard tripod socket; but with these specs, I doubt many folks will take advantage of it. The viewfinder lacks sight lines, making it difficult to ensure that your pictures will be straight. And last and least important, the QuickTake is designed for right-handers. Both the grip and the shutter release are on the right-hand side of the camera, so most left-handers (like me) will find themselves shooting with both hands.

Only Eight Pictures per Session

The QuickTake 100 includes 1MB of memory, which enables you to shoot eight full-screen (640-by-480-pixel) images, 32 quarter-screen (320-by-240-pixel) images, or a combination of the two sizes. For even the least discerning user, the quarter-screen option is prohibitively small. Even if you don't plan on using the entire full-screen photo, you'll appreciate the leeway it offers for cropping and rotating—luxuries not permitted by the quarter-screen option. Furthermore, you can downplay some of the artifacts by



Day and Night These two full-screen images were shot with the QuickTake 100 on opposite ends of a cruise boat. I shot the lower image using the camera's built-in flash. I used Adobe Photoshop to adjust the color levels of the images, but otherwise they appear exactly as the camera captured them.

resampling a full-screen image to a smaller size using Photoshop or its equivalent. Resampling a quarter-screen image doesn't leave you much to work with.

If you think you can shoot eight photos, copy them quickly to a handy PowerBook or Duo, and then shoot some more, think again. It's not that the interface is inadequate; it's a simple task to connect the QuickTake to your Mac's modem port using a standard serial cable. And a control panel allows you to mount the camera as if it were a disk, permitting you to drag-copy its contents. However, the task of lugging around your computer, setting it up on a level surface, connecting the cable, powering up, mounting the camera, copying the images, and then erasing the camera's images so you can shoot again might be best described as clumsy and certainly time-consuming. This procedure takes five minutes, and that's if you resist the temptation to view your pictures—which is, after all, the only way to get immediate feedback. Also worth noting: the QuickTake utility, which lets you view images and perform minor edits such as 90-degree rotations, requires 3MB of application RAM to open an image. So you can more or less rule out using the utility on any machine equipped with less than 5MB of RAM. If you plan on shooting lots of photos off-site, you're better off purchasing three or four cameras.

The good news is that once you press the shutter release, your photo is about as safe as rewritable media gets. The QuickTake uses Flash EPROM (erasable, programmable read-only memory), so it doesn't require a constant power supply to store your images. Even if the batteries run out of juice or you remove them, your images are absolutely safe. Unfortunately, the version of Flash EPROM that Apple provides with the QuickTake 100 doesn't allow you to erase images selectively. If you want to erase one image, you have to erase them all. So you should use this option only after transferring the images to disk, or if you've completely screwed up and want to start over again.

Incidentally, the recessed erase button on my camera broke about the fourth time I used it. When I pressed the button using a paper clip—the preferred tool for this purpose—the button gave way, never to return. I was still able to shoot photos, but I had to hook up the camera to my computer and use the QuickTake utility to erase the images.

Is the QuickTake Ready?

Though the QuickTake 100 provides too few options and too little quality to interest most photographers and image-editing professionals, it may excite the curiosity of some business types. As a real estate agent, my wife was very satisfied with the camera's ability to capture new listings that she could immediately post in the office and fax to other brokers. It's also adequate for shooting corporate badges, newsletter and presentation photos, and other images whose impact depends more on immediacy than quality. And lest we forget, every image taken with a conventional camera costs money—first for film and then for developing. The QuickTake's images are free. If you're in the market for a medium-quality, digital color camera that costs less than $1000, the QuickTake 100 is the best deal around. But if you're not in a hurry, you may want to wait until some of its more obvious problems are ironed out.

—DEKE McCLELLAND

QA-350 LCD

LCD Projection Panel

PROS: Exceptional price-performance ratio.
CONS: Not suitable for multimedia projections.
COMPANY: Sharp Electronics Corporation (800/237-4277). **LIST PRICE:** $2495.

MW ★★★

LCD PROJECTION PANELS ARE based on two technologies: passive matrix and active matrix. Because of their slower refresh rate, passive matrix models can't keep up with rapid animation and video. For projecting multimedia displays, an active matrix panel makes more sense—but a high-quality, color active matrix projection panel can cost $6000 or more. At less than half the cost of a typical active matrix panel, Sharp's QA-350 LCD offers an economical alternative for presenters who don't need multimedia capability. Using what Sharp calls Dual-Scan passive matrix technology, the QA-350 scans two lines of pixels at a time. The result is a bright, sharp image of up to 512 colors, with faster refresh than I've seen in other passive matrix panels.

When I compared it side-by-side with an active matrix panel, the QA-350 fared surprisingly well. From a distance, the images on both panels were crisp, bright, and easy to read. At close range, it was easier to see individual pixels on the active matrix image, but this didn't improve the



PAUL BERG

quality of the overall image. When images moved, the differences between the panels became more apparent. Rapid mouse movements blurred, but were still visible, on the QA-350.

A few years ago a typical passive matrix LCD panel cost about $5000, was awkward to use, and produced murky, sluggish displays. At less than $2500, the QA-350 LCD shows how far the technology has come.—GEORGE BEEKMAN

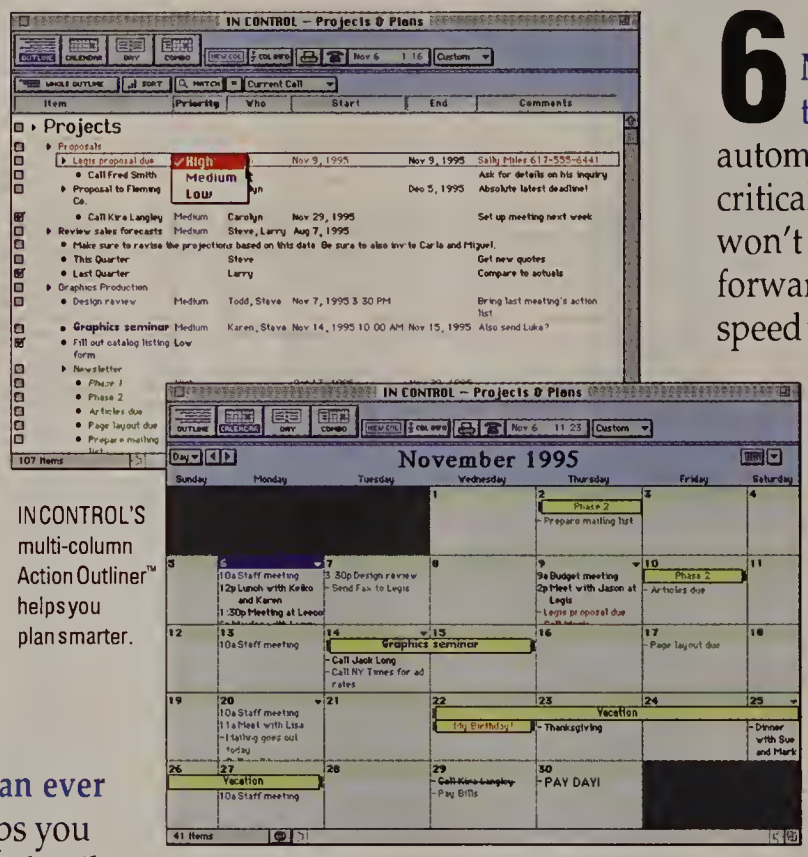
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Circle 6 on reader service card

microLaser Pro 600

Workgroup Printer

PROS: Fast; networkable; high paper capacity. **CONS:** Expensive. **COMPANY:** Texas Instruments (800/848-3927). **LIST PRICE:** $2148.

MW ★★★

IF YOU'RE LOOKING FOR THE SPEEDY Gonzalez of workgroup printers, consider the Texas Instruments microLaser Pro 600 PS65 with PowerStep. The Pro 600 is fast and flexible. It performs well and is a good choice for multiplatform office environments—but there are a few other printers that offer comparable performance for a better price.

I tested the microLaser Pro 600 with PowerStep, 6MB of RAM, and 65 scalable fonts. Retailing for $2148, the microLaser Pro 600 has an 8-pages-per-minute Sharp engine with 600-dots-per-inch resolution. The printer comes standard with 6MB of RAM (expandable to 22MB) and supports both PostScript Level 2 and PCL 5. The Pro 600 is also available in a PS23 version with 23 scalable fonts ($1599 list price, $1948 with PowerStep). The PS23 can be easily upgraded to the PS65.

TI also offers the PowerStep, an easy-to-install option that upgrades the 20MHz RISC processor to a 40MHz RISC processor. The PowerStep also adds four times the cache memory of the standard Pro 600, plus a built-in floating-point processor. This option has a suggested retail price of $349. The PowerStep gives the Pro 600 its speed: without it you survive, but the printer is slower. However, the print quality should not be affected if you skip the PowerStep option.

The Pro 600 is fast—89 percent faster than the Hewlett-Packard LaserJet 4M on Macworld Lab's Microsoft Word multifont-document test. It also fared well in other Macworld Lab tests. It was slower than the Apple LaserWriter Select 360 in the 20-page Microsoft Word single-font document and the PageMaker 4.2 newsletter, but in each case by less than 25 seconds—an insignificant amount of time for a large or complex document.

The print quality on the microLaser Pro 600 is good. Characters are smooth and well formed, especially in larger type sizes. Print quality is not quite as good as that of the LaserWriter Select 360 or the Hewlett-Packard 4M, but differences are almost imperceptible, especially for memos and typical office documents.

The Pro 600 has a fairly small footprint and should fit easily into most office environments. Including two 250-sheet paper trays, the printer weighs 32 pounds and measures 13 by 14.4 by 12.8 inches. The ability to print 500 pages without refilling a paper tray is a real advantage, especially if you use the printer in a workgroup environment. TI also sells a 30-envelope tray that replaces the upper paper tray. The Pro 600 can print all the standard paper sizes, as well as labels and transparencies. The printer driver lets you select which printer tray to print from; you can have letterhead paper in one tray and plain paper in the other. Again, this is great in a workgroup environment where the printer may serve a variety of people with different needs.

The microLaser Pro 600 is compatible with DOS, Windows, and Macintosh environments. Both a high-speed parallel interface and an AppleTalk interface are included as standard features. This printer also provides automatic port-switching, which it achieves through an Intelligent Interfacing feature that allows all ports to remain active when more than one computer is connected to the Pro 600. The printer switches between computers, automatically adjusting for each environment. Novell Ethernet (10BaseT), TCP/IP (10BaseT), SCSI, and RS-232/serial-connection options are also available.

Texas Instruments has climbed on the Energy Star bandwagon (Energy Star is the Environmental Protection Agency's standard for energy conservation); the microLaser Pro 600 is Energy Star–compliant, and *Macworld* considers this a plus. One missing option is the PostScript fax capability that is offered with Apple's LaserWriter Select 360. This option could make an already good printer even more valuable.

The microLaser Pro 600 comes with an 80-page *User's Guide* and a 22-page *Installation Guide*. The installation guide is useful, providing a good description of



ROBERT PERRY

how to set up the printer and load paper, plus information on consumables. The user's guide is also informative, with a detailed section on troubleshooting tips, a service checklist, and explanations of the LCD messages. It also elaborates on adjusting the contrast and cleaning the corona. However, I couldn't find any discussion in the manual on automatic port-switching.

Overall, the Pro 600 is fast and provides good print quality. The price is steeper than that of other products in this category, but if you work in a busy office where a really fast printer makes everybody's life easier, the higher price may be worth it.—LAUREN L. BLACK

MW LAB How Fast Is the microLaser Pro 600 PS65 with PowerStep?

Best result for each test. Times are in seconds. Shorter bars are better. Products are listed in decreasing order of overall performance.

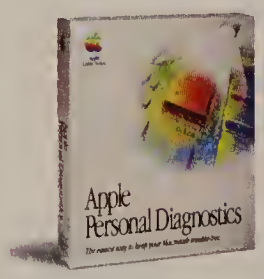
	Multiple Fonts Print speed for a typical 7-page Microsoft Word 5.0 document with a variety of fonts, sizes, and styles.	Single Font Print speed for a 20-page Word 5.0 document with double-space, 12-point Courier text in plain, bold, and italic.	MacDraw Pro Print speed for a complex drawing with few special effects, over 2000 simple objects, and several lines of Helvetica text.	FreeHand 3.1 Print speed for a complex graphic with special PostScript effects. Illustration had nonlinear blends and Bézier curves.	PageMaker 4.2 Print speed for a 4-page newsletter with several fonts, a MacPaint image, and 3 gray-scale TIFF images.	TrueType Print speed for a 1-page Word 5.0 document containing 4 TrueType fonts in various sizes.
TI microLaser Pro 600	101	165	76	192	110	50
Apple LaserWriter Select 360	113	141	89	327	93	54
Apple LaserWriter Pro 600	154	164	125	501	124	62
HP LaserJet 4M with RET off	191	163	111	488	136	77

BEHIND OUR TESTS Tests were conducted on a Mac Centris 650 running System 7.1 with 8MB of RAM, a Quantum LPS230 internal hard drive, AppleTalk on, and background printing off.—**Macworld Lab testing supervised by Lauren Black**



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Pablo 2.0.1

Database Reporting Tool

PROS: Flexible and easy to use; great implementation of table "pivot" function; good charting and object graphics. **CONS:** Maintenance of data warehouse is a serious chore. **COMPANY:** Andyne Computing (613/548-4355). **LIST PRICE:** $695; for ten users $5495; HyperCube Utilities $99.

MW ★★★★

IN A WELL-RUN DATA WAREHOUSE, A company's information-services division diligently tracks down all data relevant to managing the company and organizes it in a way that lets everyone in the company get quick answers to questions. There are plenty of ways to manage this service; most of them are based on IBM's original structured query language (SQL), but challengers to this ten-year-old technology have appeared.

One serious challenger is Pablo (PaBLO in Andyne's orthography), a new relational-database reporting tool that uses Apple's Data Access Language (DAL) to communicate with remote databases. Much of Pablo was in fact developed at Apple, where it's been in use as the companywide sales reporting system for more than a year. In Pablo's design of the data warehouse, information resides in plain two-dimensional tables linked to a hierarchy of four other tables that specify a multidimensional structure for the data. Pablo is designed to report data views that "pivot," like the views in Brio's Prism, Lotus Improv, or the upcoming Microsoft Excel version 5. In a pivoting plan, each data element (a sales total, for example) is identified by a string of labels (month, quarter, year, geographic region, specific product, product category) arranged in a special order. This identification scheme makes it possible to call up data with categories in any order. A report can be specified as "sales for the last three years by region" or expanded to "sales for the last three years by state" or shuffled to "sales by state by product category by quarter" with a few clicks.

Cubist Perspective

The basic defined-table set from which Pablo draws its reports is called a data HyperCube, since the table-plus-structure specification describes a multidimensional data object. You pick the database you want to access with the Source Browser, which lets you list local (residing on your Macintosh) and remote HyperCubes. Then you formulate your table from HyperCube data in the View Builder, which lists all the dimensions of the HyperCube you've selected and lets you pick out individual data categories for your report (see "Swing Shift").

The reporting facilities in Pablo, fortunately, go way beyond mere table construction, and also beyond the capabilities of its current competitors.

Pablo does charts from selected data and provides drawing tools to dress up reports (you can also import and place PICT files). The Data Navigator lets you pick different data sets to chart from within a report (see "Sailing"). Spreadsheet-like functions do subtotals, totals, and simple statistics on report data. This last facility is helpful in the overall Pablo scheme, because it means the designers at the corporate level responsible for HyperCube maintenance have many fewer data fields to include.

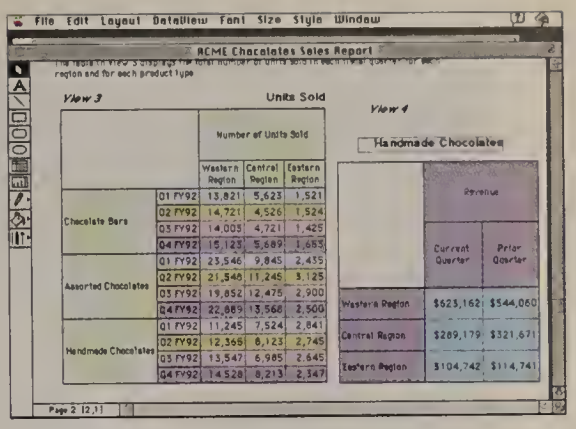
A Job for Pros

Making things easier for the information-systems department is not a small issue in Pablo. Someone has to think through a company's information requirements in advance and, in detail, find the data to fill the primary data table and specify a HyperCube structure that's rich enough to be useful (see "Square into Cubes"). If there's not enough structure in the hierarchy (the details of dimensions, levels, columns, and data members), end users will be downloading huge chunks of table to their Pablo reports for simple inquiries; if the structure is too elaborate, end users will spend hours scrolling in the View Builder to make up basic reports. Someone also has to assign user profiles for all Pablo users in the system, specifying with the Pablo password structure which users have access to what HyperCube data.

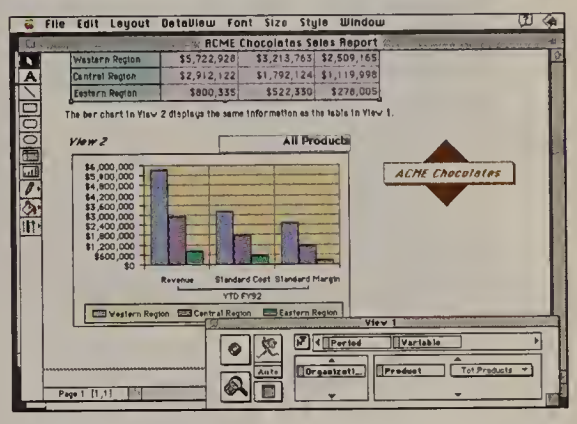
Corporate data managers that I talked with (many of whom were members of the original Apple project teams and are now implementing the technology at other large companies) describe the usual Pablo situation as an end user's dream paid for with plenty of hard work by the information-services department. It's possible to set up some HyperCubes for experiment very quickly, but refining and updating HyperCubes in an environment in which the data currently resides on a corporate-strength database or server (Butler, Ingres, Oracle, Sybase, and most other popular choices) takes months. A successful implementation of Pablo as a data warehouse system usually has the additional repercussion that, since Pablo makes data access so straightforward, it tends to make middle-management staffing look bloated.

Pablo is one of the most effective end-user data-reporting tools yet evolved. It puts a considerable workload on the corporate information department that sets up a Pablo system, but it's clearly appropriate to assign the heavy data-systems planning to a highly trained central corporate service rather than leave it to the end users. Pablo works with most popular mini/mainframe relational databases, sidesteps the hassles of SQL data access, and produces great reports with minimal effort. It's most appropriate for midsize and large companies, and in the right settings will rapidly pay for itself.

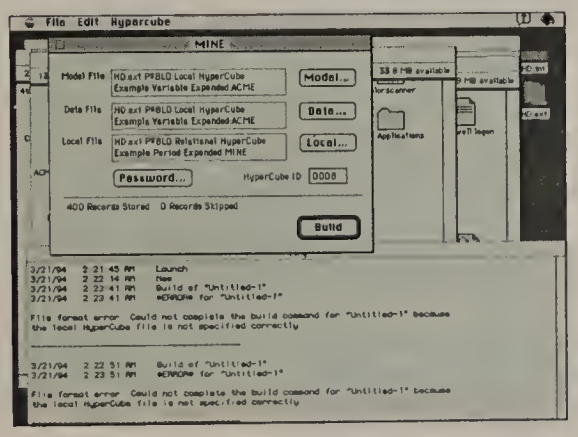
—CHARLES SEITER



Swing Shift By picking categories in the View Builder, you can easily assemble different Pablo views. Here are two selections from the same sample data set, with a basic table at left and a summary table at right.



Sailing Pablo's Data Navigator encourages you to tinker with reports in forms—you can swap data sets in and out of charts to look for data relationships.



Square into Cubes The Cube Creator is used to transform precisely formatted text tables into HyperCubes for remote or local access. HyperCube development is a job for experienced relational-database designers.

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InfoFAX

Please see page 207 for instructions.

Ray Dream Designer 3.0.3

3-D Illustration Software

PROS: Excellent texture editing; Modeling Wizard automates modeling; versatile free-form modeler. **CONS:** Unstable operation; misbehaving features; sluggish performance. **COMPANY:** Ray Dream (415/960-0768). **LIST PRICE:** $349.

MW ★★

AFTER RAY DREAM LOWERED THE price of Designer 2.0 last year, the package became an instant price/performance leader in its class, even though it needed to be renovated. Designer 3.0 is a complete refurbishment of the program, still at a commendably low price, but early releases have some wrinkles that need to be ironed out.

Ray Dream Designer 3.0 implements some well-considered architectural changes. Designer 3.0's consolidated modeling environment does away with the separate LightForge and SceneBuilder modules. Also, version 3.0 incorporates extensions, similar to plug-ins for graphics programs, that allow for adding new modeling tools and facilitate future expansion.

Ray Dream also improved Designer's controls for creating, editing, and combining textures, and added the ability to brush textures onto the surface of three-dimensional objects. The program remains an excellent ray-trace renderer and can produce images with G-buffer channels for 3-D filtering and compositing.

Designer 3.0's modeling environment starts with a 3-D perspective window where you build models and assemble scenes. As you add objects, lights, and cameras to the scene, icons representing them appear in the Hierarchy window, which displays a collapsible outline of the scene's logical structure. From the scene hierarchy, you can select objects, link them, and organize them into groups without navigating the scene to select them. Modeling tools, clip objects, and textures are extensions that appear automatically in the drag-and-drop Objects and Shaders Browsers.

Modeling extensions include a selection of object primitives, a text tool, the FreeForm tool, and the Modeling Wizard. Object primitives are simple, uneditable shapes such as spheres or cubes. The text tool creates objects from TrueType and PostScript Type 1 fonts and offers controls, including kerning and leading.

The FreeForm tool is similar to Designer's old LightForge modeler but more versatile. In a modeling window separate from the scene window, you create objects by drawing a shape on a working plane and extruding the object along an axis defined by path-description lines. You achieve more-complex constructions by adding cross sections and applying scaling envelopes that let you modify the surface contours of the object. The FreeForm tool is the heart of Designer 3.0, but learning the techniques takes practice.

Novice modelers will appreciate the Modeling Wizard. The automated Wizard lets you produce lathed, extruded, pipeline, spiral, twisted, and skinned objects via pictorial dialog boxes. Its step-by-step approach teaches you how shapes interact to produce objects. To edit Wizard-built objects you must return to the FreeForm tool.

Perspective view is Designer's default, but you can create new views, including elevations, simply by adding cameras. You fine-tune views in the Camera Settings floating window using buttons and sliders for adjusting focal lengths and controlling camera movements. If you could drag a new camera into the work space instead, and position the camera close to its final location, you could avoid much needless navigation.

On a Mac IIfx, performance is sluggish, even in wire-frame mode. Working in the flat-shading Preview mode is slow, and Better Preview is even slower. Previews render in the background, but if you need to see the composition before you take your next action (such as moving an object, changing camera positions, or adding a texture), be prepared to wait while everything redraws. Flat shading takes longer still.

Scenes get visually cluttered, even in the preview modes, after placing just a few objects. The many bounding boxes and projection lines quickly turn a simple scene into a rat's nest. If you turn off the reference grids, the projection lines disappear, but you lose depth perception.

Designer 3.0 comes with both surface and procedural textures that you apply by dragging. The program also lets you paint textures directly on the surface of 3-D objects using brushes and geometric shapes. This sounds like a great feature, but it's so slow on my IIfx that it's frustrating to use. As you drag the brush, there is a delay that makes you wonder if the tool is working at all.

The Shader Editor's card-file metaphor provides wonderful controls for manipulating and combining textures. For example, you can combine a texture with a bump map to get a dappled surface, then mask it onto a checked pattern to produce a quilt effect.

The manual's descriptions lack depth and often deviate from the program's reality. Release notes (Read Me files on disk) chip at the problem but barely make a dent. Early releases of Designer 3.0 are confounded by annoying operational foibles and instability. For example, multiple-vertex outlines in the FreeForm modeler get extraneous lines between vertices. Reference planes turn themselves off when you switch camera views. Labels on the Camera Settings floating palette, such as front or left, inexplicably get changed to custom. Worse, sometimes the camera's viewpoint is altered. The brush and polygon painting tools behave unpredictably. The list goes on.



Off to See . . . The Modeling Wizard automatically creates complex objects from your menu selections.

Ray Dream rapidly introduced releases; I reviewed both 3.0.2 and 3.0.3. The program still needs maintenance, but a Ray Dream spokesperson told me that the company is committed to its customers and will work to make the program sound.

Although Designer 3.0 remains a price leader, it has faltered significantly in performance. At the core of Designer are excellent rendering tools and a competent modeler. When the program's problems are rectified, that combination should hold it in good stead again.

—CARLOS DOMINGO MARTINEZ

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4th Dimension ..... 6 Videos
Canvas ..... 5 Videos
ClarisWorks ..... 6 Videos
Design & Layout ..... 1 Video
Desktop/PrePress .... 2 Videos
Director ..... 4 Videos
Excel ..... 5 Videos
FileMaker Pro ..... 4 Videos
Mac Fonts ..... 1 Video
FreeHand ..... 4 Videos
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Integrate Programs. 1 Video
Lotus 1-2-3 ..... 3 Videos
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MacDraw Pro ..... 2 Videos
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Circle 106 on reader service card

Ear Phone Streamline AV

Telephone/Speech-Recognition Earpiece

PROS: Better audio quality than provided by AV PlainTalk microphone; improves speech-recognition accuracy; unobtrusive design. **CONS:** User can't hear error beeps, modem tones, or other computer audio without unplugging or wearing the earpiece; some discomfort after prolonged use. **COMPANY:** Jabra Corporation (619/622-0764). **LIST PRICE:** $169.

MW ★★★

HISTORY HAS RECORDED FOR ALL time the first words that Alexander Graham Bell said to his assistant through the telephone: "Come here, Watson, I need you." But few people know that the great inventor also designed the first speakerphone. Upon hearing Bell through the contraption for the first time, Watson reportedly replied, "Hey boss, why are you talking into a coffee can?"

I have yet to hear a speakerphone that didn't sound like an empty can of Folger's, and that includes the speakerphone that's essentially built into the AV Macs and Power Macs. Plug an Apple GeoPort Adaptor into one of these Macs and you have a high-speed fax/data modem and a voice telephone, too. It's what some call *integrated telephony*. (*Telephony*, by the way, rhymes with *Stephanie*. A tele*phony* is someone who tells lies over the phone.)

Jabra's Ear Phone Streamline AV takes the coffee can out of integrated telephony and replaces it with some privacy. The Ear Phone looks like, well, an earphone—the kind that lets you listen to TV without waking the spouse—but it also contains a microphone sensitive enough to pick up your voice. A 6-foot cable terminates in a tiny black box, from which extend two short cables; one plugs into the Mac's microphone jack and the other, into the audio jack. You can connect an Ear Phone in less time than it took to read this paragraph. (You can also connect an Ear Phone to an Apple AudioVision 14 display, but configuring the monitor's control panel for the proper sound levels is a bit cumbersome. It's easier to use the Mac's rear-panel jacks.)

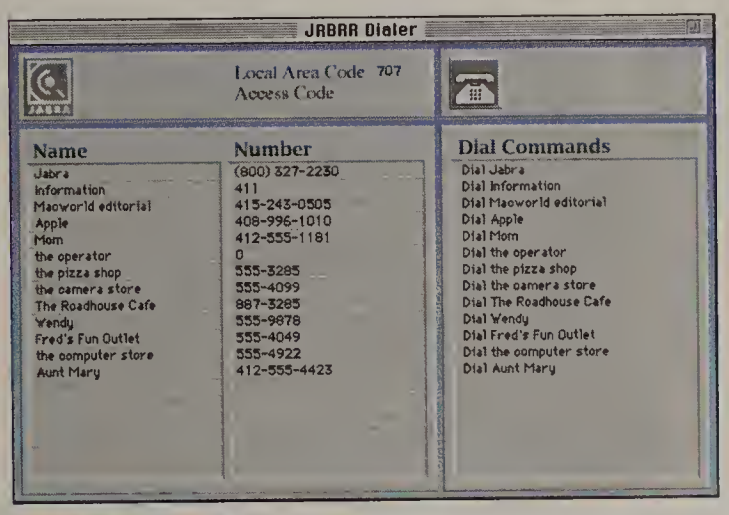
Making Calls

What's it like to wear this thing? It's reasonably comfortable, although it began to bother me after about an hour. A small foam cover makes the earpiece—the ear bud, as Jabra calls it—more comfortable than a typical earphone. For the fashion conscious, Jabra sells replacement foam covers in various colors.

The Ear Phone also includes plastic loops in several sizes. The loop snaps onto the ear bud and then hooks over the top of your ear to hold the ear bud in place. The Ear Phone box also contains a coupon advertising a custom ear mold available from Westone Laboratories (719/540-9333). Replacement ear molds are available for approximately $35 each.

The Ear Phone includes a simple telephone-dialer application that stores up to 20 phone numbers and lets you assign a spoken command to each one. The dialer works together with Apple's Apple Phone application (which is included) to let you issue spoken commands such as "dial home" or "dial the office."

Using voice commands to make calls would be more practical if you could dial numbers stored in contact databases and other documents. The AV version of the Ear Phone doesn't permit this, but a forthcoming Power Mac version will. The new version, which should be available by the time you read this, will use Apple's Telephone Manager—a system software extension that implements telephony-related functions—to enable you to dial a number regardless of where it's stored, and to do so with spoken commands, at that. After releasing the Power Mac version, Jabra may add this capability to the AV Mac version, but at this writing Jabra hasn't decided on a schedule.



Make a Call for Me The Jabra Dialer application lets you store up to 20 phone numbers and dial them with spoken commands, shown at the far right of the dialer window.

At the other end of the line, the Ear Phone sounds like a standard telephone, with none of that coffee-can echo that speakerphones generate. (If you're interested in hearing a demo, I've created a short, sound-only QuickTime movie that compares the Ear Phone to the standard Apple PlainTalk microphone. You can download the movie from the Macworld Online forum on America Online. Once in the Macworld Online forum, click on the Software Library icon.)

The PlainTalk Angle

Unlike any other third-party microphone I know of, the Ear Phone Streamline AV works with the PlainTalk speech-recognition features that are standard equipment in AV and Power Macs. In my tests, conducted on a Quadra 840AV, speech recognition was indeed more accurate. One reason is that the Ear Phone's microphone is always the same distance from your mouth—this generally isn't the case with the Apple PlainTalk microphone.

Another reason is that a system extension included with the Ear Phone modifies the audio levels going into the Mac for better recognition. By fine-tuning the volume levels, Jabra engineers—some of whom worked for Articulate Systems, a pioneer of Mac voice-recognition products—have made real improvements in PlainTalk's accuracy.

There's a side benefit to using the Ear Phone for speech recognition: only you can hear the computer's spoken responses. If you're using PlainTalk's text-to-speech capabilities to, say, read your incoming electronic mail, you need not worry about coworkers overhearing your Mac—or your Mac annoying your coworkers.

You Can't Hear Unless You Wear

Perhaps the biggest drawback of the Ear Phone is that because it disables the Mac's speaker, you can't hear all the other Mac sounds—like when the modem makes a call and connects, or when an audio CD plays in play-through mode—unless you unplug or wear the Ear Phone. This is a side effect of having a computer that also acts as a telephone and a modem and a CD player. The fact remains, though, that the unplug-and-plug routine is tiresome, not to mention hard on the Mac's jacks.

The Ear Phone's simple appearance and straightforward operation belie the engineering efforts that went into it. As a hands-free telephony tool—and as a replacement for the Apple PlainTalk microphone—the Ear Phone AV is a winner.—JIM HEID

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Lee Varis
Digital Artist

"KPT is not only great for dazzling special effects, but it provides a wealth of tools for the nuts and bolts work we all do every day."

About the Image. Renowned digital artist/photographer Lee Varis of Los Angeles, Calif., filled in the world of "The Hermit", one in his series of haunting tarot card images, using Kai's Power Tools. The KPT Gradient Designer produced the glowing orb and its cascading rays, the KPT Texture Explorer created the card's border, while the KPT Sharpen Intensity filter brought out details in the rock. To build the dream-like landscape on the horizon, Varis used a beta version of the awesome KPT Bryce™, a powerful natural and supernatural 3-D landscape creation program—coming soon from HSC Software.

November 1993 MacWEEK ★★★★★ · MACWORLD MW ★★★★★ May 1994 · ★★★★★ Publish · NewMedia Magazine Awesome April 1994

HSC SOFTWARE

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Circle 5 on reader service card

QMS ColorScript Laser 1000

Color Laser Printer

PROS: Durable output; versatile paper-handling and networking features; low cost-per-page. **CONS:** Complex engine requires more maintenance than monochrome lasers. **COMPANY:** QMS (205/633-4300). **LIST PRICE:** $9999.

MW ★★

THE QMS COLORSCRIPT LASER 1000 breaks new ground: it's the first color laser printer to sell for under $10,000 (even if it is just a dollar under), and it's the first color laser printer for the desktop (if your desktop can hold a large picnic cooler that weighs 106 pounds).

The ColorScript Laser 1000 uses an 8-pages-per-minute, 300-dots-per-inch print engine whose single paper tray can hold 250 sheets. (A second tray is optional.) The printer comes with 12MB of memory (expandable to 32MB), a 60MB internal hard drive that stores downloadable fonts and incoming print jobs, and 65 fonts. Built-in network ports include LocalTalk, Centronics parallel, and serial; Ethernet and Token Ring network interfaces are optional.

The ColorScript Laser 1000 is about four times as complex to set up as a monochrome laser: you need to install four developer cartridges, four toner cartridges (cyan, magenta, yellow, and black), a cleaning pad, a bottle of oil (it keeps the toner from sticking to the printer's heat rollers), a photosensitive belt, and a hopper that holds waste toner. These consumables need to be replaced at varying intervals: every 3000 pages for the oil, for instance, and once a year or so for the belt.

As with a monochrome laser printer, the time between toner feedings varies—pages with a lot of color or black use more toner than do pages containing very little. This contrasts with thermal-wax and dye-sublimation machines, which use the same amount of ink ribbon for each page regardless of a page's contents. This, and the ColorScript Laser 1000's ability to use conventional photocopier bond paper, makes the machine's cost-per-page significantly lower than that of thermal-wax and dye-sub technologies—roughly 5 to 10 cents per color page, compared with about 60 cents for thermal-wax, and several dollars for dye-sub.

How does the output look? Very good. The colors aren't as vivid as those produced by competing technologies, but they're perfectly adequate for business documents—bar charts, colored headlines, and transparencies. The printer's text quality is almost as sharp as that produced by a monochrome laser printer, and generally sharper than thermal-wax and dye-sub output. The print is also more durable than ink-jet or thermal-wax output: it doesn't smear if it gets wet (ink-jet output sometimes does), and it's nearly indestructible: unlike the wax applied by thermal-wax machines and the ink from solid-ink printers such as Tektronix's 300i, the ColorScript Laser 1000's color toner doesn't scratch off when you paper-clip it, or flake when you fold it.

The ColorScript Laser 1000 also fared well on Macworld Lab's test track, although its overall performance was half that of Tektronix's Phaser 220i, the fastest thermal-wax machine available. The printer was particularly slow in the Photoshop test. Further incentive to look elsewhere for prepress work is that the printer doesn't do as good a job with scanned images as do thermal-wax machines (such as Tektronix's Phaser 200 series) that provide enhanced halftoning options. Also, color laser technology doesn't allow for as much consistency in color as do the thermal-wax, solid-ink, and dye-sublimation techniques.

Macworld Lab encountered a compatibility glitch with the ColorScript Laser 1000, which uses a PostScript-clone interpreter. In its PostScript Level 2 mode, the printer choked on a Microsoft PowerPoint document with Microsoft's Wingdings TrueType font (similar to Zapf Dingbats). In Level 1 mode, the same document printed without incident. QMS was able to reproduce the problem, but at press time had not yet isolated it.



SCOTT PETERSON

The ColorScript Laser 1000 succeeds in combining the versatility of monochrome laser printing with attention-getting color. Business documents look great—don't be surprised to see people gaze at them up close and ask how you printed them. A ColorScript Laser 1000 is too slow to replace a monochrome workgroup printer, although for business documents its output is in the same league. It's also ideal for short runs of color documents—printing 50 copies of a presentation, for example.

Note that other firms, most notably Hewlett-Packard, are expected to unveil color lasers soon. If you don't need to chase rainbows right away, you might wait and see if the competition drives prices down and capabilities up.—JIM HEID

How Fast Is the QMS ColorScript Laser 1000?

Best result for each test.
Times are in seconds.
Shorter bars are better. Products are listed in decreasing order of overall performance.

	PostScript Graphic	Object-Oriented Graphic	Photoshop RGB Using Driver	Page-Layout Document	Presentation-Graphic Transparency
	Print speed for a FreeHand illustration that includes special PostScript effects, such as nonlinear blends and Bézier curves.	Print speed for a complex MacDraw Pro document with more than 840 color objects, most of them gradient-filled.	Print speed for a 7MB, 200-dpi, RGB Photoshop file using the printer's driver.	Print speed for a four-page PageMaker newsletter with several fonts, an EPS graphic, a PICT file, and a color TIFF file.	Print speed for a PowerPoint transparency with gradient background and color TrueType text.
Tektronix Phaser 220i (thermal-wax)	87	351	618	171	55
CalComp ColorMaster Plus XF (thermal-wax)	144	378	586	301	91
Tektronix Phaser 300i (solid ink-jet)	142	396	737	406	92
QMS ColorScript Laser 1000 (laser)	116	446	3121	230	107

BEHIND OUR TESTS

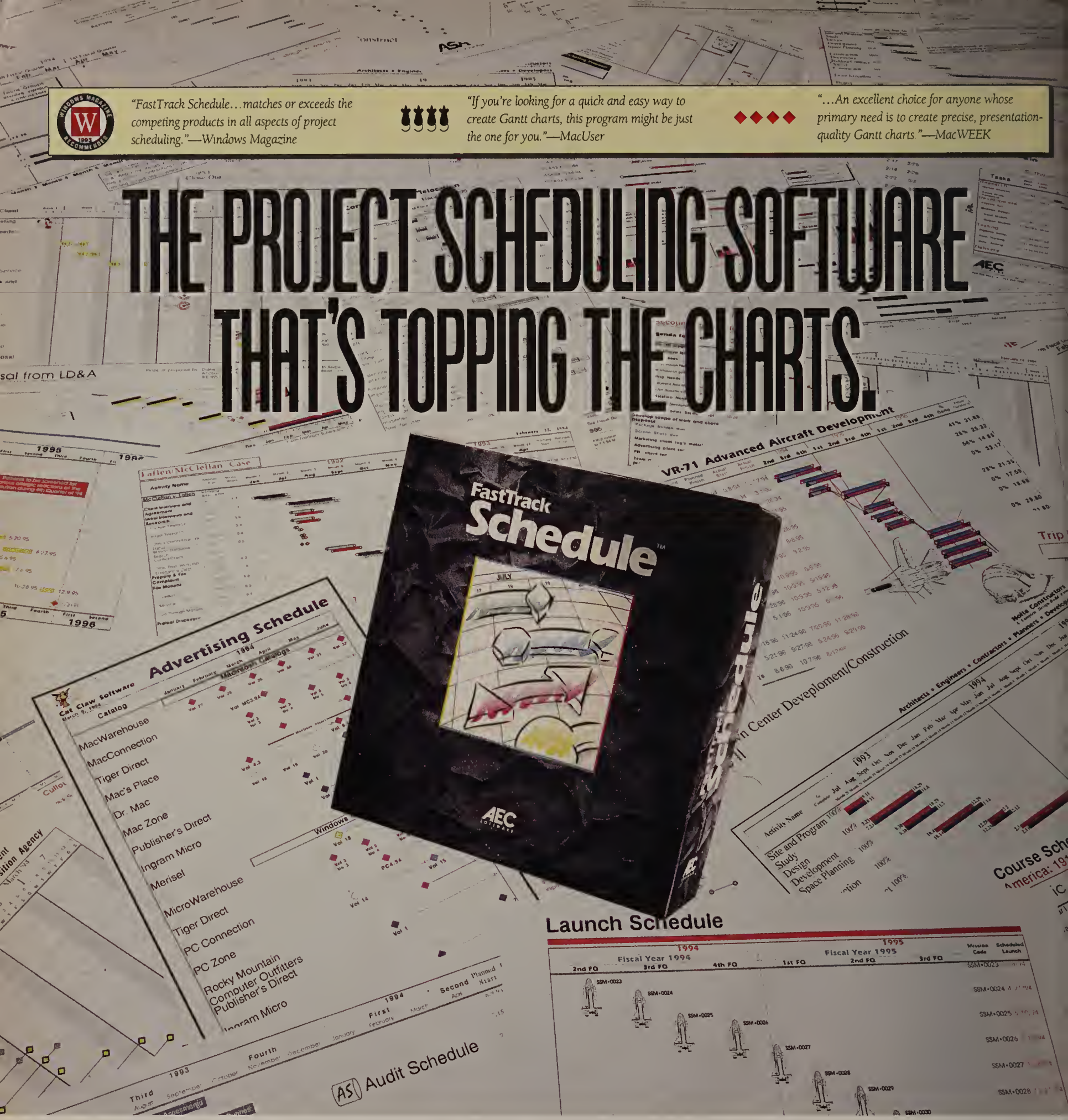
Printers were tested with a Centris 650 with System 7.1, LaserWriter Driver 8.1, 8MB of RAM, a Quantum LPS230 internal hard drive, AppleTalk on, and background printing off.—**Macworld Lab testing supervised by Mark Hurlow**

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Circle 44 on reader service card

IX-4015 Color Image Scanner

Color Flatbed Scanner

PROS: Good image quality; fast scans; excellent bundled software; small footprint. **CONS:** Scan size limited to 8.5 by 11.7 inches. **COMPANY:** Canon Computer Systems (714/438-3000). **LIST PRICE:** $1169.

MW ★★★★

THE CANON IX-4015 COLOR IMAGE Scanner is a 24-bit color scanner that delivers good-quality scans and is easy to use. The IX-4015 scans at an optical resolution of 400 dots per inch by 800 lines per inch, and provides interpolated resolutions of 800 dpi for color scans and 1200 dpi for line art. Scanning software consists of IX Scan (an Adobe Photoshop–compatible plug-in) and Light Source's Ofoto 2.0. The unit comes with all the cables you need for hookup. An optional automatic document feeder (not tested) is available if you will be doing OCR work. The IX-4015's conveniently small footprint (16 by 11.2 by 3.2 inches) is also a bit of a limitation, because the scan area is confined to A4 size (8.5 by 11.7 inches).

Setup was easy, helped by the good documentation and quick-start guide. The scanner is rather unusual in that it has both of the common types of SCSI connectors on the back: a 50-pin plug as well as a DB-25 connector. (Most SCSI devices have two identical ports.) The two ports on the IX-4015 worked normally; I was able to daisy-chain another SCSI device from the scanner without problems.

The IX-4015 is a one-pass scanner, which accounts for its fast scan times. Using IX Scan within Photoshop, prescans of an 8-by-10-inch gray-scale photo at 400 dpi took about 20 seconds, and the actual scan took 55 seconds. Color photos at the same resolution had the same fast previews, but took approximately 135 seconds to scan. Using Ofoto to scan is considerably slower, doubling the IX Scan times.

IX Scan is a well-designed scanner interface for Photoshop (see "Get the Picture"). After prescanning, you can crop the scan area using the selection rectangle. IX Scan allows you to set the print and scan resolutions, and includes contrast, brightness, and threshold controls. You can also change the gamma curve and dither pattern of your scans. The only thing amiss with the plug-in is that it shows the size of the selection rectangle in pixels instead of the more useful inches or centimeters. You can also simulate gray scale from line art with the Dither and Error Diffusion settings. IX Scan produces clean black-and-white images, as well as good-quality 8-bit gray-scale and 24-bit color scans. While IX Scan is convenient for Photoshop users, using Ofoto provides superior scans. Ofoto's automatic straightening, cropping, moiré removal, and calibration features make scanning an easy but slow process (for more on Ofoto, see *Reviews*, *Macworld*, July 1993).



PAUL BERG



Get the Picture IX Scan makes it easy to acquire scans from within Photoshop and provides a wealth of image-adjustment controls. It even estimates how much disk space your scan is likely to take up.

Canon's toll-free technical support was adequate but not stellar. The technician I spoke with was helpful, but wasn't familiar with the product and needed to ask other staff members for help. I did get my questions answered correctly, but it took a while.

The IX-4015's price is competitive with other color scanners, and its speed and excellent bundled software make it easy to use and a good choice for the small office. If you can get by without legal-size scans, this scanner should serve you well.—TOM NEGRINO

TopDown 4.0

Flowcharting Program

PROS: Automatically creates lower-level charts; clustering of symbols reduces chart clutter; increased speed draw; eight user-definable symbol palettes. **CONS:** Only black-and-white icons. **COMPANY:** Kaetron Software Corporation (713/298-1500). **LIST PRICE:** $345.

MW ★★★★

TOPDOWN FLOWCHARTER 4.0 INcludes the standard flowcharting features, such as multiple symbol palettes, a palette of ANSI symbols, custom symbol creation, custom line-styling, and multipage drawings. It's what TopDown adds on top of the standard features that makes it a more productive tool.

TopDown allows you to quickly create a flowchart by doing many things automatically: drawing identically sized symbols wherever you click, joining symbols, routing connector lines, numbering symbols. If you're brainstorming, StarBurst mode lets you automatically link subsidiary ideas or topics in a tree or hierarchy. Creating an organization chart is a breeze with this option enabled. You can, of course, always use the manual override for any automatic option.

Although flowcharts present processes and information graphically, documentation of a flowchart can also be an issue. To solve this problem, TopDown allows you to create a Notecard of up to 32,000 characters for each symbol used on a flowchart. In addition to printing each Notecard, TopDown can generate an outline report listing all symbols and their associated text, a cross-reference report listing each symbol and any symbols attached to it, and an error report listing symbols that have data coming in (an arrow points to the symbol) but no data coming out (there is no arrow pointing away from the symbol).

Flowcharts have a tendency to become large and cluttered. TopDown provides four features to help deal with clutter and unwieldy diagrams. First, you can split any chart's window into four panes that allow you to see four different areas of the chart. Second, you can create an anchor that acts like a bookmark; the Go To Anchor command takes you to the anchor location automatically. Third, you can create an overview chart in which each symbol represents a lower-level chart. (The number of lower-level charts is limited only by the memory available

continues

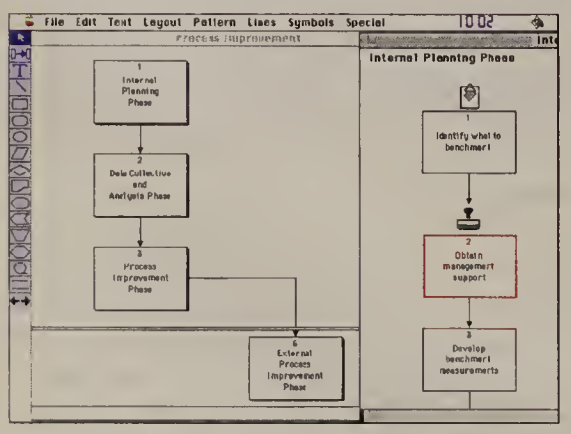
to the program.) Last, with the Cluster command you can select a group of symbols and their connecting lines and automatically paste them into a lower-level chart; TopDown replaces the clustered symbols with a single symbol on the original diagram. This option is particularly convenient for reducing clutter.

TopDown provides several ways to navigate lower-level diagrams. You can select a symbol to represent a more detailed lower-level diagram; TopDown then draws this symbol with a shadow to show that a lower-level chart is linked to it. The lower-level chart automatically opens so that there are now two windows on the screen. Clicking on the chart's title takes you to a hierarchical menu listing all open drawings; you can also select a chart from the Show Hierarchy command.

Although TopDown supports a maximum of nine symbol palettes, including the ANSI palette, you probably won't want to use all of the available palettes in one flowchart—rotating through all the palettes is counterproductive.

TopDown also has tools for custom symbols. One way is to create 32-by-32-pixel black-and-white icons that become part of a symbol. In addition to using the FatBits editor (included in TopDown), you can open any paint file from within TopDown and select a portion of the drawing to be an icon, or you can create custom symbols with TopDown's drawing tools. Once you have drawn and saved these icons, you can resize and enter text in them just as with the standard symbols.

I recommend TopDown, both for its power and its ease of use. TopDown's support for custom symbols, multiple palettes, and automatic drawing aids, along with its ability to let you easily create and navigate lower-level charts, make it tops in my book.—DAVE KOSIUR



Two Layers The left-hand window shows the main flowchart split into two panes so that the top few symbols and the bottom symbol are visible. All the symbols in the main chart have shadows, indicating that lower-level charts are linked to them. The window on the right is a lower-level flowchart representing the Internal Planning Phase (symbol 1) from the other chart.The first and second symbols have custom icons.

WaterMark Message Central 2.0.2

Voice-Mail System

PROS: High-quality voice-mail setup; decent fax capability. **CONS:** Poorly written manuals; lacks support for multiline systems; modem limited to 2400-bps voice; terminal software lacks good scripting tools and Zmodem support. **COMPANY:** High Tide Software (510/704-9927). **LIST PRICE:** $499; 14,400-bps modem $100.

MW ★★★

ON THE SURFACE WATERMARK Message Central sounds really good. It's a highly sophisticated voice-mail and messaging system that includes a specially modified modem with voice chip, as well as fax software and regular telecommunications software. And it all comes in one box, ready for installation. Unfortunately, the program's very poor documentation is its one serious weakness. You're likely to need support from your dealer or the publisher's support people to get this program up and running. Still, if you're willing to put in some effort to learn the program, you'll find WaterMark Message Central a supremely flexible tool. It's of particular benefit to many small-business users, as well as to families for whom a normal answering machine just won't do. (At press time, High Tide announced version 2.1.1 with support for a pager and call forwarding.)

WaterMark Message Central offers basic answering-machine capabilities, such as the ability to record your messages and retrieve them from your computer or via a remote touchtone phone. It adds the ability to create separate voice-mailboxes—for example, one for each employee in your company, or for each family member. You can link each mailbox to other mailboxes, allowing the caller to select from a multitude of options. Just as with the more expensive systems used by large businesses, WaterMark prompts the caller to select a specific choice. One such option allows callers to access messages left specifically for them by typing in the last four digits of their phone number. To ensure privacy, you can assign each mailbox its own password for retrieving messages.

WaterMark Message Central also includes a decent fax program, which can be used separately to send and receive faxes or as a fax station linked to the voice-mail system. The fax station lets callers leave a voice message and send a fax with the same phone call.

To keep this program from ending up as just an overpriced answering machine, you have to spend up to several hours configuring and testing your settings. You set up the voice mail using the WMController application. Once configured, WaterMark works quite well. Outgoing and incoming messages reproduce clearly and distinctly at a volume level that matches that of a regular phone call. The whole network of nested messages and reminders worked flawlessly during my tests. The program puts up a flashing icon at the right of the menu bar showing the number of messages it has received. You can play back these messages (through the modem's speaker) or save them as document files for later review.

There are some downsides. The biggest one is that the program supports



Setting Up Your Voice Mail You use the WMController application to record outgoing messages and configure voice mailboxes.

only one phone line. Also, when a call is received or a fax sent, the program puts up a modal (nonmovable) dialog box that prevents you from using your Mac till the action is finished. If you want to use the recommended High Tide High Quality sound capability, you have to turn off AppleTalk. The program is probably most effective on a dedicated Mac.

A no-frills communications program, Communicate Lite from Mark/Space Softworks, is included. The program works well, but lacks scripting tools and support for any file-transfer protocols beyond the basic Xmodem.

WaterMark Message Central is not going to be everyone's cup of tea. Unless your needs extend far beyond a normal answering machine's capabilities, it may not be worth the time and energy involved in the initial setup process. But if you are running a small business, or your family has complicated voice-messaging needs, and if you are willing to put in a little time and effort, you'll find it a very useful product.—GENE STEINBERG

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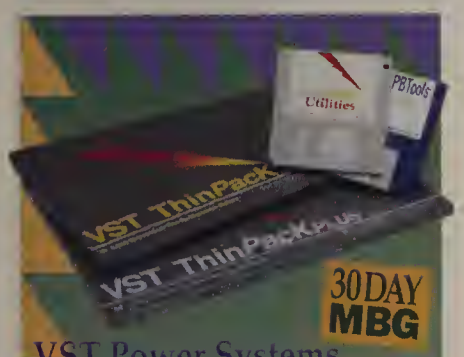
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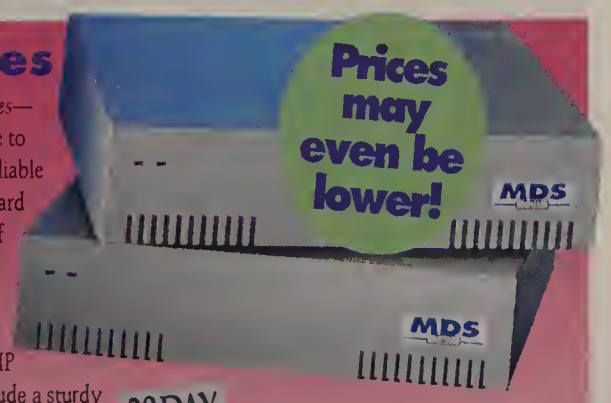
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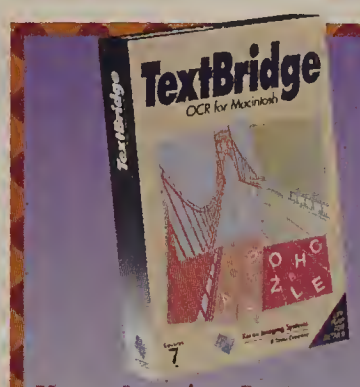
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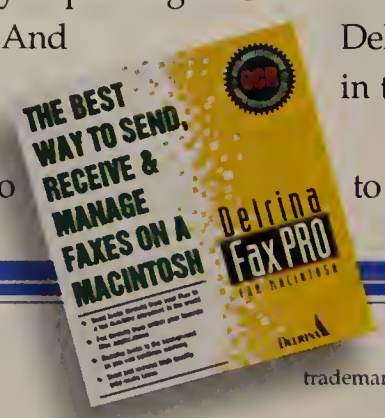
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Pointillist

Stereogram Software

PROS: Inexpensive; fun to use; will amaze your friends. **CONS:** Enthusiastic viewing of stereograms can give you headaches. **COMPANY:** Pictor GraFX (310/865-0495). **LIST PRICE:** $39.95.

MW ★★★

IF YOU'VE ALWAYS LOVED OPTICAL ILlusions, or snuck away to distant theaters and anonymously slipped on blue and red glasses to watch 3-D movies, Pointillist is the program for you. And even if you haven't had a lifelong yearning to fool your brain into seeing things that aren't there, Pointillist is a gleefully wacky program in these days of megamergers and serious computing.

What Pointillist does is make stereograms. Stereograms are images that look, at first glance, like random dots, but as you focus on a plane *beyond* the focal point of the page or screen, a 3-D image emerges from the pattern and appears to hover inches in front of the background.

The Official Secret Decoder Book, known in more stodgy products simply as the manual, describes four reliable ways to learn how to see the 3-D images. All of them are ways to help you get your eyes to focus beyond the image. If you can imagine staring at the horizon while also looking at a piece of paper a few inches in front of your face, you've got the basic idea. Once you can see the images emerge from the background, you can blink or move farther away to find a comfortable viewing distance. But don't change your focus, or you'll lose the 3-D effect and simply see a dot pattern again.

Pointillist comes in four different modules. GraFX Viewer 1.0.2 lets you open and view stereograms. SuperDots 1.0.2 enables you to create your own stereograms from PICT files. GraFX Stereograms and GraFXgrams are screen savers that work with Berkeley Systems' After Dark to project stereograms and stereogram animation on your monitor.

To make your own stereogram, you first create an 8-bit PICT image in a paint program. Then you open SuperDots and choose Create Stereogram. The pattern-selection dialog box opens with four choices of dot patterns (black-and-white, gray-scale, or color-random dots, or a custom PICT pattern of your own design). You then open up the picture that you want to make into a stereogram, and the program goes to work.

SuperDots converts your PICT image into a gray-scale image (if it was originally a color image), then creates an illusion of depth based on the darkness of each area in the picture. The darker the gray, the farther away it appears; the lighter the gray, the closer the image appears. Once the stereogram is completed, you can add color overlays and borders to dress them up.

Provided you have After Dark 2.0, GraFX Stereograms and GraFXgrams work like other After Dark add-on screen savers, showing a cycling display of your stereograms or stereogram animation on your screen. The program ships with 40 stereograms and 3 animated sequences, so you have plenty to look at even before you start adding your own designs.

Pictor GraFX promises that a more elaborate product called HoloVision will be available in the near future for those budding stereogram artists who want more control over the creation and design of their 3-D work. For now, SuperDots and any paint program provide enough of the basics to whet the appetite of all but the most one-dimensional.—LIZA WEIMAN



Before The base 3-D image here is a gray-scale image created in a paint program. The colored dots at the top represent the portion that SuperDots has already converted into a stereogram image.



After If you hold this image close to your face, then move it slowly away from you without changing your focus, the image of the crane should appear to be hovering above the background.

MacMoney 4.01

Personal-Finance Software

PROS: Easy to learn and use; good graphing and reporting features. **CONS:** Lacks investment-tracking and tax-reporting features found in competing programs. **COMPANY:** Survivor Software (310/410-9527). **LIST PRICE:** $89.95.

MW ★★★

GOOD FINANCIAL SOFTWARE SHOULD be flexible enough to easily handle most of your financial-accounting needs. MacMoney 4.01 has new and improved features that will please its longtime users, but the program hasn't kept up with the leaders in the field and probably won't win many converts.

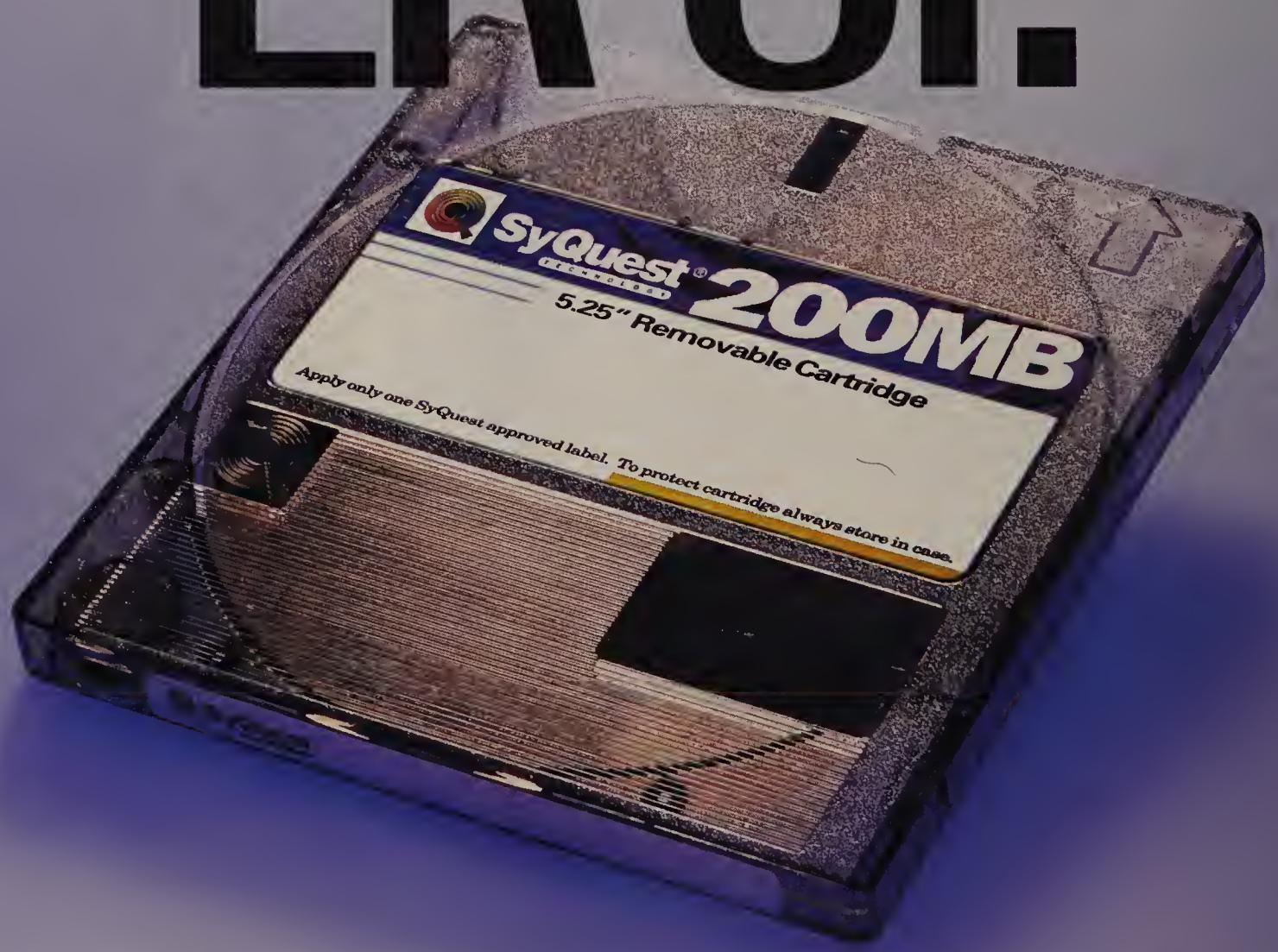
New to MacMoney is the ability to use a "13th month" at the end of a year, which gives you the time to receive and pay outstanding bills and gather other information you need before closing one fiscal year and starting the next. You can now create subcategories for transactions; for example, you can have a main category called Automobile and subcategories called Service, Insurance, and Fuel; and you can rearrange the categories and subcategories. Many of MacMoney 4.01's improvements are extensions of the previous version's features. You can now have up to 25 destination categories for a split transaction; handle as many as 30,000 records per year; use longer payee names; have up to 1000 categories, Names, and ID Codes (which allow you to group transactions for later reporting); and switch between report, graph, and transaction windows.

Automatic-transaction capabilities are improved, too. You can now edit transactions, set them to occur biweekly instead of just monthly, and set them up in accounts other than bank accounts. MacMoney can now import data from Intuit's Quicken, the CheckFree electronic-payment service, and Aatrix Payroll; but it can't transmit data to CheckFree directly, as can Quicken and MECA's Managing Your Money (MYM).

Maintaining control of your finances requires that you get useful information from your financial program, and MacMoney offers a good selection of customizable reports. The new version adds a few default reports and lets you open more than one report at a time. MacMoney's financial graphs are especially impressive: you can choose from canned graphs, or create customized pie, line, and

continues

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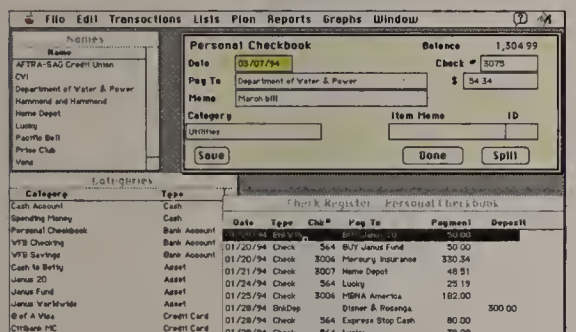
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Circle 249 on reader service card

bar charts. You can also save customized reports and graphs for repeated use.

The problem with MacMoney isn't so much what the program includes; it's the features that it lacks and that are available from the competition. Unlike Quicken or MYM, MacMoney can't track stocks, bonds, or mutual funds. You can work around this by using asset accounts and calculating your portfolio value fluctuations manually, but the process is inconvenient. Taxes are another weak point for MacMoney. For example, MYM has extensive tax-estimation abilities that enable you to assign categories to specific lines on IRS tax forms; Quicken is almost as good as MYM in this area, and it also handles loans better than MacMoney does. Survivor Software needs to add these features to MacMoney to stay competitive. I'd also like to see the program get a face-lift—it is easy to use, but its user interface looks outdated (see



Like Paper, but Smarter MacMoney's unadorned interface makes for easy data entry. You fill out forms that look like their paper counterparts, so it's hard to make a mistake.

"Like Paper, but Smarter"). By default, reports even use outlined and shadowed text, which looked cool in 1985 but is passé nine years later.

The MacMoney version I reviewed had a few minor bugs, such as incorrect totaling of some categories on a report. A call to Survivor Software revealed that the bugs I'd found had been fixed, and the company sent me an update disk. Technical support, while not toll-free, was friendly, accurate, and free of charge. The company also provides good support via fax and online services.

The personal-finance market is competitive; to keep their place, programs need to constantly evolve, or they risk being left behind. Unfortunately, MacMoney 4.01 has been outdistanced by its rivals. If your finances are fairly uncomplicated, and you want a program that is easy to use, then MacMoney will do the job. But if you need to track even simple investments or estimate your tax liability during the year, look to MYM or Quicken.—TOM NEGRINO

DiskTop 4.5

File-Management Utility

PROS: Customizable views; pop-up menus for direct access to frequently opened folders; good file-launching module. **CONS:** Accompanying text-search software incompatible with 68040-based Macs. **COMPANY:** PrairieSoft (515/225-3720). **LIST PRICE:** $99.95.

MW ★★★★

DISKTOP IS A SIMPLE BUT POWERful file-management utility that lets you copy, move, rename, delete, and find files—without using the Finder. Furthermore, when you need to organize large numbers of files on different volumes, DiskTop handles virtually all of these tasks more quickly and effectively than the Finder does.

Longtime DiskTop users know how handy this unassuming desk accessory can be. With the release of version 4.5, DiskTop is even more powerful, and its revamped interface design gives it a polish it lacked before.

You access DiskTop from the Apple menu or by using the built-in hot-key combination ⌘-shift-D. The lower half of the program's main screen contains a window that displays a directory of each disk connected to your Mac (similar to a list view in the Finder). The top half of the DiskTop screen contains a set of 3-D–style buttons you click on to perform various file-management tasks.

You can now fully customize the interface with ten different custom list views, each containing only the file information you want to display. You can rearrange the order of columns by dragging them, and you can make the columns as wide or narrow as you want.

A number of improved features speed up most jobs. For example, there are keyboard shortcuts for all the major file-management tasks. When you press the ⌘ key, DiskTop displays the shortcuts right on the main interface buttons, so it's easy to learn the shortcuts.

The improved interface makes navigating your folders easier, too. By adding the names of frequently accessed folders to the main Drive pop-up menu, you can jump straight to the listed folders.

DiskTop's search functions outperform the Finder's Find command. You can simultaneously search for files by any combination of name, creation date, modification date, type, creator, and size. (The Finder handles only one kind of search at a time.) Once you find the files you want, you can retain the results of the search and add to the current found set with subsequent searches.

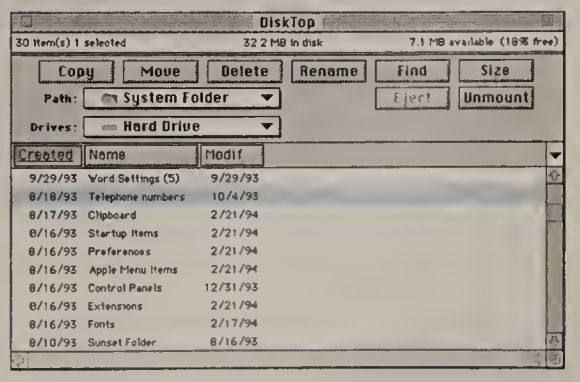
DiskTop is also great for handling System 7 aliases; the program lets you create and move aliases with a single command, saving you the trouble of first creating an alias and then dragging it into the desired location.

Of course, the program also enables you to do some things you can't do with the Finder at all—like making folders and files completely invisible, or editing the four-letter type and creator codes the Macintosh uses to identify files. (You occasionally need to do this to repair a damaged file.)

The new version also makes it easier to export file information to other applications. File lists that are displayed by DiskTop can now be exported as tab-delimited text files.

PrairieSoft is shipping DiskTop with two add-on modules. DiskLaunch is a utility that allows you to bypass the Finder to launch applications and open files. From anywhere on screen, you can access a pop-up menu listing your most frequently used applications and documents. Just select the ones you want from the menu, and DiskLaunch opens them.

The other module, Gofer, is a text-search-and-retrieval utility program from Microlytics that allows you to search for strings of text within documents. There are two disappointments, though: Gofer provides no printed manual—just a lengthy documentation file on one of the installation disks. And more important, the version of Gofer that ships with Disk-



DiskTop's New Look The new version of DiskTop sports an improved interface with 3-D buttons and customizable list views. The custom view shown here, for example, contains only the file names along with their creation and modification dates.

Top, 2.0, is incompatible with all 68040-based Macs. You have to send in a coupon to get the free 040 upgrade, which was still being beta-tested when this review was written.

But even without DiskLaunch and Gofer, DiskTop is a valuable package that makes organizing a crammed hard drive a more manageable task.—JOSEPH SCHORR

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TurboDialer

Automatic Telephone Dialer

PROS: Dials numbers from your Mac; works with multiline phones; cheap. **CONS:** Sounds seep into phone conversations; not compatible with some PBX systems. **COMPANY:** Advanced Software (408/733-0745). **LIST PRICE:** $79.95.

MW ★★★★

MY FINGERS USED TO GET NUMB from dialing phone numbers all day. But sensation has returned since I started using the TurboDialer. This automatic telephone dialer takes advantage of the Mac's ability to produce the dial tones. It's a box, about the size of a pack of cigarettes, with a speaker on one side.

As far as computer connections go, it's fairly simple. One cord comes out of the TurboDialer and plugs into the Mac's sound-out port. You plug another cord into your phone where your handset normally goes; then you plug your handset into a jack on the TurboDialer. Once you have connected everything, any sound your Mac makes comes out of the speaker on the TurboDialer except touch-tones, which get passed on to the handset.

Because the device plays the touch-tones through your handset, the TurboDialer works only with telephone systems that accept touch-tones. Those include many multiline phone systems, as well as some PBX systems. Certain PBX systems work with the device only after you manually dial the phone for an outside line; others don't work with the TurboDialer at all. If you have any doubts, check whether your phone accepts analog input at the handset.



TOM GIBSON

The TurboDialer ships with its own extension, DirectDial. DirectDial can dial a phone number from any application. All you do is highlight the number and hit a user-definable hot key. You can configure DirectDial to preface a phone number with 9 to get an outside line, if necessary, or to not dial the local area code. In addition to DirectDial, most database, card-file, and contact-management programs can produce dial tones.

This product is not without glitches. The TurboDialer's speaker doesn't sound as good as the Mac's internal speaker. More important: in theory, only touch-tone sounds pass through the TurboDialer to the handset of your phone. Any other sounds the Mac makes merely play on the TurboDialer's speaker. In practice, it's a different story. If you're on the phone when your computer makes a noise, the TurboDialer transmits the noise faintly both to you and to the person with whom you're speaking.

A grounding problem with Centrises creates a hissing noise on the phone as long as the TurboDialer's connected. Advanced Software says this problem is limited to the Centris models. I found the noise irritating enough that I kept the TurboDialer connected to my Mac II at work and not to my Centris at home.

Except for the occasional computer noise that seeped into my phone conversations, I found the TurboDialer to be a well-executed product. If you constantly dial phone numbers that are stored in your computer, I highly recommend it.—PAUL DEVINE

LabView for Mac 3.0.1

Data Acquisition and Analysis

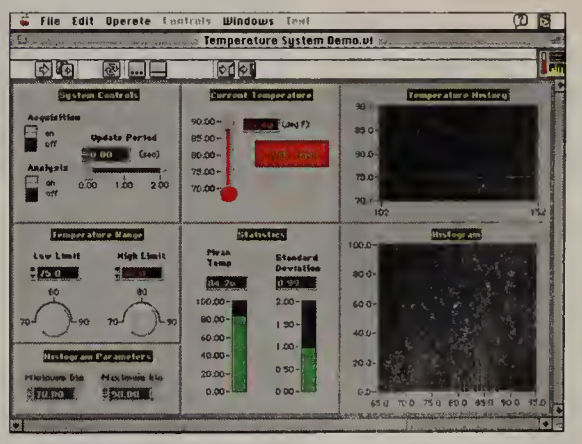
PROS: Complete system for analyzing experimental data; access to giant virtual instrument library. **CONS:** Overkill for simple applications. **COMPANY:** National Instruments (512/338-9119). **LIST PRICE:** $1995.

MW ★★★★

THE SCIENTIFIC-INSTRUMENT BUSINESS underwent a revolution in the 1980s. As fast, inexpensive computers became available, equipment designers realized that you could get a signal converted to digital form and get the digital data into computer memory, where all sorts of processing could be accomplished with software. Instead of real physical special-purpose instruments, "virtual instruments" could take over the instrument market.

National Instruments has become the leading exponent of this virtual instrument (VI) approach. You can string together a few LabView icons to simulate a traditional scientific measuring system, but National Instruments has anticipated practically every useful system known to modern laboratory practice, and huge libraries of third-party virtual instruments are available. A new batch of signal-analysis Measurement VIs of interest to electrical engineers (power spectrum, amplitude and phase measurement, impulse and transfer response functions) expands the already large built-in VI package, and another VI for automating repetitive testing makes the Measurement VI package more useful on the test bench.

In version 3.0.1, a uniform programming environment across Sun (Unix), PC Windows, and Mac platforms has been established, making VIs from all three groups distributable to the others. This software leverage, combined with the acquisition of HiQ, means that LabView has no real competitors at the high end of the data-acquisition and -analysis market. Several other programming constructs improve the 3.0.1 package: simple usage of global variables, local variables to control instrument-panel elements, and occurrence functions to help manage timing. As in earlier versions, there's provision for integrating LabView code with C language code in the MPW environment, and the software still manages data acquisition for IEEE 488 and VXI bus hardware products. A native-mode PowerPC version should be available by the time you read this.



Switched On You could build this monitoring demo yourself in half an hour, but LabView includes it and dozens of other ready-to-go examples. Version 3.0.1 offers easier programming of front-panel controls and indicators.

LabView 3.0.1 is a different product from the original. And its Texas-based developers may have thought a little too big for some users. Full use of version 3.0.1 requires 12MB of RAM, 24MB of hard disk space, and a math coprocessor. So if your lab has older Macs, especially in some low-velocity activity such as temperature or humidity monitoring, you might find products from Remote Measurements or GW Instruments better suited for the task. But for large-scale, demanding projects in data acquisition and analysis, LabView 3.0.1 is an unchallenged standard, in a class by itself. —CHARLES SEITER



Other categories:

- 1000 - Sunrises and Sunsets
- 2000 - Mountains of America
- 3000 - WW II Planes
- 4000 - Porsche Racing
- 5000 - Coasts
- 6000 - Wild Animals
- 7000 - Sailboats
- 8000 - Birds
- 8100 - Birds II
- 9000 - Trees and Leaves
- 10000 - Air Shows
- 11000 - Patterns
- 12000 - Underwater Reefs
- 13000 - Flowers
- 13100 - Flowers II
- 14000 - The Arctic
- 15000 - China and Tibet
- 16000 - Rural Africa
- 17000 - Ireland
- 18000 - Western Canada
- 19000 - Arizona Desert
- 20000 - Spirit of Buddha
- 21000 - Auto Racing
- 22000 - Bridges
- 23000 - People
- 24000 - Churches
- 25000 - Food
- 26000 - Lakes and Rivers
- 27000 - Waterfalls
- 28000 - Fields
- 30000 - Egypt
- 31000 - Residential Interiors
- 32000 - Deserts
- 34000 - Aviation Photography
- 35000 - Insects
- 35100 - Insects II
- 36000 - New Zealand
- 36100 - New Zealand II
- 37000 - Fighter Jets
- 40000 - Fireworks
- 42000 - Predators
- 43000 - Waterfowl
- 44000 - Alaska
- 45000 - Underwater Life
- 46000 - Hawaii
- 47000 - Turkey
- 47100 - Turkey II
- 48000 - Northern California
- 49000 - Apes
- 50000 - California Parks
- 51000 - Cactus Flowers
- 52000 - Butterflies
- 53000 - Mexico City
- 54000 - New Mexico
- 55000 - Korea
- 56000 - Sacred Places
- 57000 - Old Singapore
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Grolier Multimedia Encyclopedia

CD-ROM Encyclopedia

PROS: Encyclopedia text is fully indexed and easy to search and meander; relatively fast access times; multimedia elements embrace a broad spectrum of topics. **CONS:** Some of the animation and video clips are clumsy; a few hierarchy glitches. **COMPANY:** Grolier Electronic Publishing (203/797-3530). **LIST PRICE:** $395.

MW ★★★★

IF YOU BELIEVE, LIKE I DO, THAT ELECtronic search algorithms are second only to plumbing when ranking advances in civilization, you'll find the newest version of the Grolier Multimedia Encyclopedia to be a first-class Boolean treat. The disc indexes the entire text of the 21-volume Grolier Academic American Encyclopedia and arranges the more than 33,000 topics into easy-to-navigate, logical hierarchies. A search on the word *silicon*, for instance, yields a list of 177 topics ranging from cement to semiconductors.

Among the many still images in the Pictures database are examples of tools, animals, political and religious leaders, architecture, and astronomy. Audio selections include animal and bird sounds, highlights from historic speeches and musical scores, and samplings of musical instruments from accordion to zither. (The encyclopedia requires at least an 8-bit color system, 1.5MB of free RAM, 3MB of hard disk space, and a QuickTime-capable CD-ROM drive.)

More than 50 video clips offer short takes on topics as diverse as Venus flytraps and the first moon landing. Given the size and resolution constraints of QuickTime movies, many of the videos are murky and difficult to make out. But some, like the footage of the *Hindenburg* disaster, are spectacular.

The 15 Multimedia Maps and the 13 Knowledge Explorer multimedia essays offer brief glimpses of broad topics—the Civil War, women's suffrage, the workings of the human body. The Painting and Sculpture essay, for instance, rapidly presents images ranging from cave paintings through Nam June Paik's video sculptures.

The disc offers an intriguing window onto the kinds of interactive reference materials we can anticipate. However, I couldn't help wishing that a few of the lesser video clips and animations had been sacrificed to make room for more fulsome text—Dr. King's entire "I Have a Dream" speech rather than the very brief quip describing it, for example.

Timeliness is another issue. The last bibliographic reference for computer graphics is from 1987; the last for computer memory is from 1985.

Future versions will no doubt clean up some of the hierarchical snafus. When you choose to view art images, for instance, you find two of van Gogh's paintings listed under his name; a third is found under its title, *Chair and Pipe*.

Still, the good points of the Grolier encyclopedia are worth extolling—it has excellent search capabilities, it weighs much less than a shelf full of books, and it's fun. —SUZANNE STEFANAC



Search and Enjoy Access to text elements via the alphabetized Title List, robust Word Search, chronological Timeline, and hierarchical Knowledge Tree is straightforward and fairly fast.

Helix Express 2.0.1

Relational-Database Software

PROS: Intrinsically multiuser, client-server design; built-in document management; updates information immediately across a network. **CONS:** Icon programming sometimes awkward. **COMPANY:** Helix Technologies (708/465-0242). **LIST PRICE:** $589.

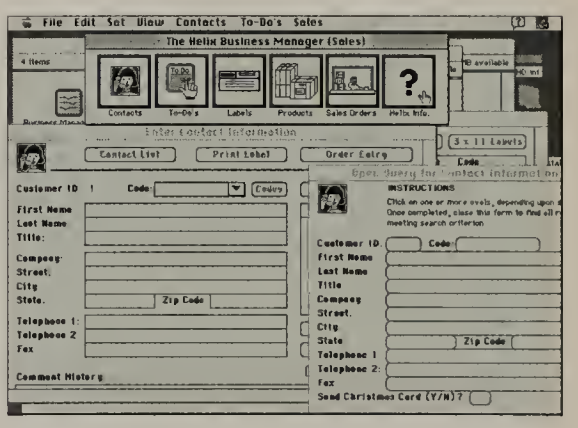
MW ★★★★

HELIX TECHNOLOGIES PIONEERED a unique, icon-based programming technology for relational databases on the first Macs. The program has a devoted following, mainly because a Helix database is easy to modify—and databases always seem to need modifying. Early versions were slow, but version 2.0.1 is much faster. Search speed is about four times quicker in 2.0.1 than in 1.0, and on the new faster Macs it tackles megarecord files with no problems. Although it can't compete with Microsoft's FoxPro/Mac in raw search speed, Helix's performance is no longer objectionable, and multiuser operation is downright snappy.

Helix introduced binary large objects (BLOBs) as data structures a few years ago; a BLOB field in a Helix database can be text, a picture, sound, or any Mac file type. Helix used BLOBs to design a separate document-management system that was folded into Helix Express 1.0. Version 2.0.1 now supports access to externally stored documents. This means that a Helix database can manage access to huge, network-based piles of information while the database itself remains relatively compact. Helix now updates information immediately across a network as soon as a user makes a change (updating access is managed with a detailed password-administration system).

Besides the basic speed improvement, query forms no longer redraw after a query value changes; text fields can now contain keywords as indexed subfields; and a Power query mode lets you formulate record searches in something approximating English, rather than using a query form. Report generation has been improved by an automatic multicolumn, multirow feature that lets you make spreadsheetlike reports, with the equivalent of in-cell scrolling.

Helix Express 2.0.1 custom database development has been simplified in two different ways. Developers can get an unlimited number of run-time versions for $495 (clients in client-server mode can be activated with a call to Helix). And a new book,



Simplicity Helix Express 2.0.1 includes examples of basic business applications that users can modify and extend. Even with no background in programming, tinkering with Helix databases is fairly simple.

Riding The Helix Express, by Jan Harrington (Helix Technologies, $29.95, 1994), explains how to do real Helix business applications of varying complexity. Although it's easy to set up quick-and-dirty database models in Helix, making optimal use of the tiles and abaci (Helix's programming elements) calls for some guidance. Nonetheless, users who want to upgrade to relational-database capabilities should look at a Helix Express demo. Helix's claim that its database is geared to nonprogrammers is quite valid, and now the program's improved performance makes it a serious competitor with 4D, Omnis, and FoxPro for all-Mac networks.—CHARLES SEITER



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VirtualDisk 1.1a

Disk-Cataloging Software

PROS: Rapid cataloging of removable disks; fast, efficient label printing; excellent disk-copy utility. **CONS:** Label-printing application cannot save files. **COMPANY:** Continuum Software (206/695-8136). **LIST PRICE:** $69.

MW ★★★★

VIRTUALDISK HAS ONE BASIC PURpose, which it fulfills extraordinarily well: it catalogs removable disks, including floppies, SyQuest cartridges, Bernoulli disks, and opticals. The process is practically automatic. As you dismount a disk, VirtualDisk goes into action (indicated by a progress bar on screen). Within a few seconds, the program records the disk's directory and stores it in the VirtualDisk folder.

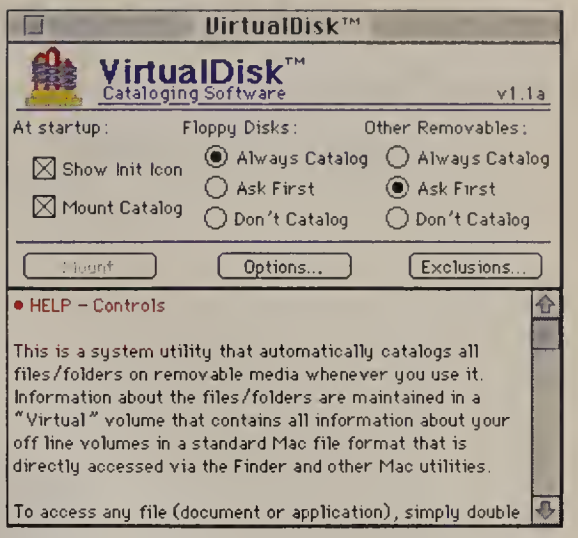
Inside VirtualDisk's colorful desktop folder is the catalog itself, consisting of the icons of all the disks you've added to the catalog. When you double-click on a catalog icon, you see the original disk's directory (although creator information isn't displayed). You can search for the files you want using the Finder's Find feature. When you double-click on any file in the directory, a message asks you to insert the original disk on which the file resides. Once you mount the disk, the file opens normally.

There are a handful of options in the VirtualDisk control panel, such as whether to catalog floppies and/or removables, and whether the program should ask you to OK the cataloging process. An Options button lets you save icons in your catalog and choose whether the icons should be black-and-white or color.

Two additional utilities are packaged with VirtualDisk. The first, EasyLabels, allows you to print a disk's directory in any of several standard Avery label formats. You can customize labels. Alas, you cannot save the label sheets you create—the program's sole, annoying shortcoming.

The second utility is the shareware favorite DiskDup+, which offers full track-by-track copying of your floppies. DiskDup+ also reads and mounts disk images created in Apple's Disk Copy format. The program, which sells for $20, is bundled with VirtualDisk at no extra cost.

By default, a VirtualDisk catalog takes 1MB on your hard drive. The catalog expands as its contents increase (up to 65MB if you ever get close to its 300,000-file limitation). VirtualDisk is almost invisible in actual use, except for the progress bar it displays when it scans a new (or changed) disk. In using VirtualDisk, I encountered none of the quirks I found when reviewing a competing program, Atticus Vista.



Setting Up Your Virtual Disk Click on the Mount Catalog option to begin the disk-cataloging process.

The brief manual clearly describes how to use VirtualDisk and EasyLabels. The VirtualDisk control panel provides online help. When trouble arises, Continuum's customer support is easy to reach (it's a toll call), friendly, and informative.

Judged alone, VirtualDisk is perhaps the best solution to your disk-cataloging woes. When you add EasyLabels and DiskDup+ to the mix, it's an excellent value indeed, and I highly recommend it.
—GENE STEINBERG

Automap Road Atlas for Macintosh 2.01

Mapping Software

PROS: Simple to use; requires only 5MB of hard drive space. **CONS:** Slow screen redraw; does not list every street in North America; only supports cut-and-paste export. **COMPANY:** Automap (206/455-3552). **LIST PRICE:** $99.95.

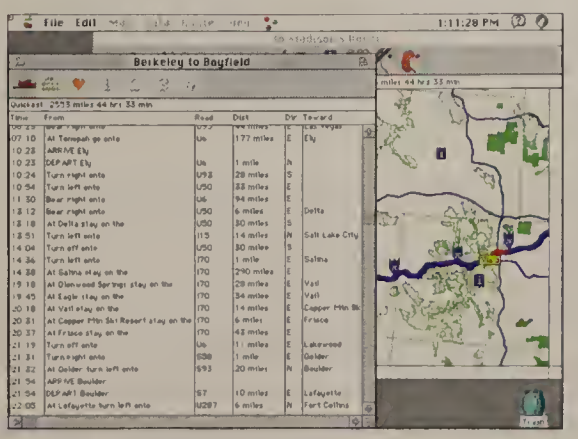
MW ★★★★

BEFORE I HAD AUTOMAP, I SPENT hours planning long road trips. I also spent hours getting lost on those trips. Automap Road Atlas saves me a lot of time and a lot of frustration.

Automap uses a database of freeways, highways, and state and county roads to calculate routes between more than 120,000 North American locations. It's a tool for finding the best routes between cities and towns. Unlike some CD-ROM atlases, Automap's database doesn't include every street on the continent. Automap won't help you find the best route between bookstores in Manhattan, for example. But the program fits on a PowerBook hard drive (using only 5MB of disk space), and unlike the CD-ROMs, Automap tells you how to get where you want to go.

After setting preferences such as driving speed and whether you like to drive on freeways or smaller roads, you tell Automap where your trip begins and ends by selecting points on a map or by entering place names in a dialog box. You can name up to four places that you want to visit (or avoid) along the way. Then you click on Calculate.

In a few seconds, Automap finds the quickest, the shortest, or the preferred route for your journey. Automap draws an easy-to-read map highlighting the route and creates written driving directions with estimated travel times. You can adjust the level of detail and amount of territory the map displays, and then print the map and a separate sheet of directions.



Turn Here Automap's driving instructions tell you how to get where you're going and how long it will take to get there.

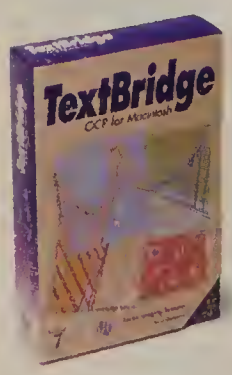
Automap finds recreational areas, reports state driving laws and populations, and lists phone numbers for local tourist and chamber of commerce information.

There is room for improvement. Automap gave a few directions like "Take the Unknown 15 miles." The program can't store more than one set of preferences. And Automap supports cut-and-paste exporting of its maps and data, but not tab-delimited data export. Also, the map window took about 30 seconds to redraw on a 40MHz 030 Mac. Although the lag is annoying, I found the result worth the wait. Still, Automap tells you how to get where you're going better than any other map, atlas, or software I've seen.—JIM FEELEY

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Financial Competence 1.5

Business Economics Tutorial

PROS: Easy to use; explains financial statements in easy-to-understand terms.
CONS: Undistinguished graphics; overpriced.
COMPANY: Competence Software (603/435-5098). **LIST PRICE:** $99.

MW ★★

IF YOU'VE EVER LOOKED AT FINANcial statements and found them intimidating or just plain baffling, then the maker of Financial Competence wants you. Its seven-lesson system demystifies three basic types of financial statements—income statements, balance sheets, and cash-flow statements. Text, simple graphics, and basic animation make these instruments and their relationships comprehensible to businesspeople, students, and the general public.

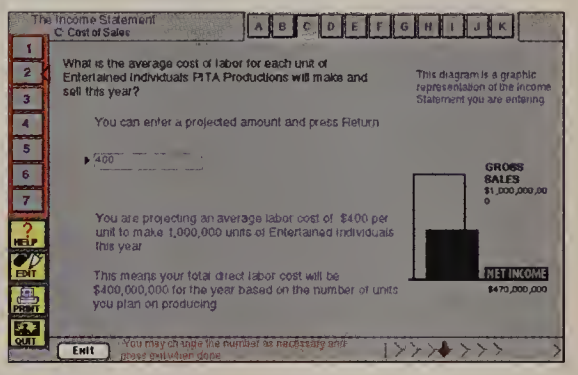
Lessons consist of several sections and a quiz. You're encouraged to proceed in order; after scoring at least 80 percent on all quizzes, you receive an on-screen certificate. The program tracks your progress so you can quit and continue later where you left off. A browse mode lets you explore the program but without a "reward."

At various points Financial Competence prompts you for information about your business; you can supply real or made-up data. For example, in the lesson on income statements, you learn what cost of sales consists of by entering cost figures for material, labor, and overhead. The tutorial then uses these, and other numbers you provide, to explain the connections between various financial-statement entries—the effect cost of sales has on gross margin, for example, or the relationship of operating expenses to operating income. You can export data from the program to a spreadsheet or word processor.

Much of the information in financial statements involves where a business's money comes from and where it is spent. To demonstrate this, Financial Competence frequently shows an animated wad of currency moving from one graphic (such as a bank) to another (such as a factory). Unfortunately, these animations are painfully slow, even on a Mac IIsi with 5MB of RAM. While it does help convey the idea of cash flow, by the 15th journey or so, the traveling money becomes extremely annoying, and there's no option to shut off animations.

The program comes in a canvas moneybag stuffed with packing paper printed with pictures of 20-, 50-, and 100-dollar bills. And all in all, it's a mixed bag. You needn't worry that the tutorial is too complicated for a nonbusinessperson (like me); Financial Competence assumes no prior knowledge of financial statements. Everything is explained in fairly basic terms, new information is introduced very slowly, and some concepts are repeated several times. Like the cash-flow animation, this approach may facilitate comprehension, but it might also make you impatient after a while.

As advertised, Financial Competence explains how financial statements are compiled and how they relate to each other. You could learn the same thing from a book, though, faster and for less money. And that might be the more financially competent thing to do.—MICHAEL ROSENTHAL



Facing the Figures Financial Competence uses data you supply to demonstrate how financial statements are put together.

Small Blue Planet 1.2.1

Educational CD-ROM

PROS: Nicely integrated collection of beautiful Earth-from-space images; users can add custom pop-up annotations; includes world map showing pattern of day and night. **CONS:** Lacks many features of standard atlases; text is poorly edited; no search function. **COMPANY:** Now What Software (415/885-1696). **LIST PRICE:** $79.95.

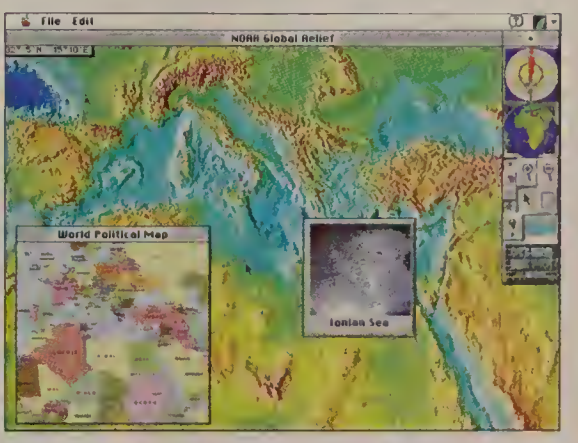
MW ★★★

SMALL BLUE PLANET: THE REAL PICture Atlas is a nicely integrated compilation of Earth-from-space images from many sources, including the CIA, NASA, the U.S. Geological Survey, and the National Oceanic and Atmospheric Administration. This visually stunning CD-ROM is organized around three main images: a global relief map composed of satellite images that colorfully display both oceanic and continental contours; a mosaic relief map of the 48 contiguous United States, dramatically rendered in shades of gray; and a somewhat disappointing political map of the world showing only countries—current as of November 1993—and national capitals.

You can zoom in on any of the main maps in ever greater detail, or soar across the globe in any direction. In addition, Small Blue Planet pinpoints smaller-scale images with red markers; one click on a marker opens a thumbnail preview, and another click displays the image at full size. While pop-up location identifiers are available in many small-scale images, there is little logic to what is identified—Genoa and Venice, for example, but not Rome—and some identifiers (such as Kilauea Volcano) are positioned incorrectly. You can also add your own pop-up annotations to any image. A window containing country-specific data is available in the main political map, and you can obtain information—often either incomplete, too technical, or blatantly promotional—on every image.

A separate part of the program, the Chronosphere, dramatically (and dynamically) illustrates the pattern of day and night on the world relief map. A Gallery section displays thumbnail pictures of all the disc's images (sorted first by type of remote sensor, then by image title), but inconveniently, no search function is available to quickly locate an image of a given location.

Small Blue Planet is not as comprehensive as a standard reference atlas, and it lacks many atlas features, such as distance scales, a master index, and information to help you interpret map colors or contours. Some small-scale images are not accessible from the most logical main map; for example, you can reach a beautiful mosaic relief image of Italy from the main political map but not from the relief map. Other problems include a manual that's too brief, some poorly edited text in the program, and a lack of overall online help. But maps and Earth-from-space images are endlessly fascinating, and the contents of Small Blue Planet are no exception.
—ROBERT C. ECKHARDT



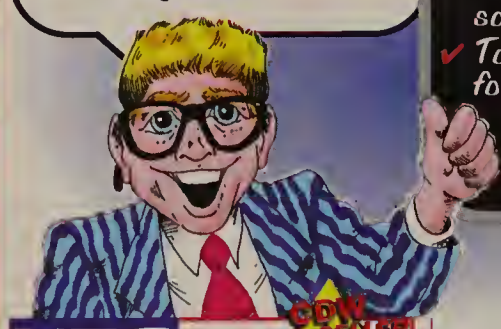
Around the World in One CD-ROM In Small Blue Planet's main relief map you can view a small political map of the same area; a small window in the upper-left corner displays the latitude and longitude of the pointer.

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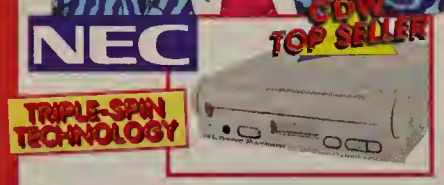
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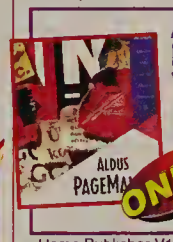
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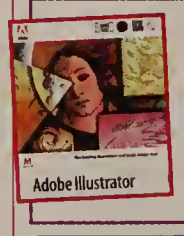
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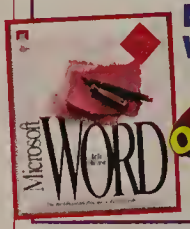
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PowerBooks: The Next Genera

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APPLE'S NEW NOTEBOOKS BOAST 040 POWER AND A RADICAL NEW DESIGN

BY CARY LU

When Apple introduced the PowerBook line in 1991, it changed the way Macintosh users thought about laptop computers. Previously, Apple's idea of portability was the Macintosh Portable, a 16-pound system that contradicted its name. Now, a million PowerBooks later, Apple's new 68LC040-based 500-series PowerBooks represent a notebook-computer design as radical as that of the original PowerBooks.

The four 500-series PowerBooks are the first Apple notebooks to offer 040 performance, but they boast much more than a faster processor. On the outside, a new case design, a unique trackpad that replaces the familiar PowerBook trackball, and a larger display give the 500-series PowerBooks a distinctive look. Important, but less apparent, features include a new nickel–metal-hydride (NiMH) battery, an Ethernet interface, 16-bit sound, and provision for either a second battery or PCMCIA (Personal Computer Memory Card International Association) cards.

The New Lineup

Four PowerBooks make up the 500 series and replace all 100-series PowerBooks, except for the 145B ($1599) and 165 ($1869). The PowerBook 520 and 520c have passive matrix screens and use 25MHz 68LC040 CPUs. The 520c also represents Apple's first implementation of color dual-scan LCD technology. The result is a passive matrix color screen that's superior to the 165c's, though still inferior to active matrix screens. Apple prices were not final at press time, but the 520 will cost from $2000 to $2200, and the 520c, from $2600 to $2900. These prices include 4MB of RAM and a 160MB hard drive.

The PowerBooks 540 (64 levels of gray) and 540c (up to 32,000 colors) have active matrix displays and 33MHz 040 processors. The basic 540 configuration ($3000 to $3300) will ship with 4MB of RAM and a 240MB hard drive; the basic 540c ($4000 to $4500) will ship with a 320MB hard drive. The 540 and 540c are also available in a configuration that in-

PHOTOGRAPHS BY JEFF JOHANN/CREEN IMAGES BY JAMES BENSON/CHECK SIX, MIKE DORNHEIM/AIRBORNE

tion



Apple's PowerBook 540 (top) and 540c.

cludes 12MB of RAM and a modem. All 500-series PowerBooks are expandable to 36MB of RAM. And yes, all four 040 PowerBooks can be upgraded to PowerPC 603–based Power Macs. The PowerPC upgrade will enable your PowerBook to run both native-PowerPC code and 680X0 code under emulation.

Upgrading to a PowerPC PowerBook should not be difficult because the 040 CPU resides on a daughterboard, not on the motherboard itself. Making the upgrade to PowerPC will involve only swapping CPU cards. Unlike earlier PowerBooks, the new 500 models open up easily, allowing you to add accessories. Remove two screws and the keyboard comes off, opening up space for three plug-in cards: the CPU daughterboard, the RAM card (which plugs into the daughterboard), and the modem card (see "The Pull-Apart PowerBook"). Changing the hard disk drive is only a little more difficult.

To accommodate all the new features, the new PowerBooks have a slightly larger case—a quarter-inch wider and almost a half-inch deeper than the 100-series PowerBook case; the weight remains about the same but depends on the configuration. The 500-series models look like no PowerBook you've seen before. The new case design shows more curves and angles than the squarish older models; for example, the palm rest at the front of the case curves downward.

A Faster PowerBook—Sometimes

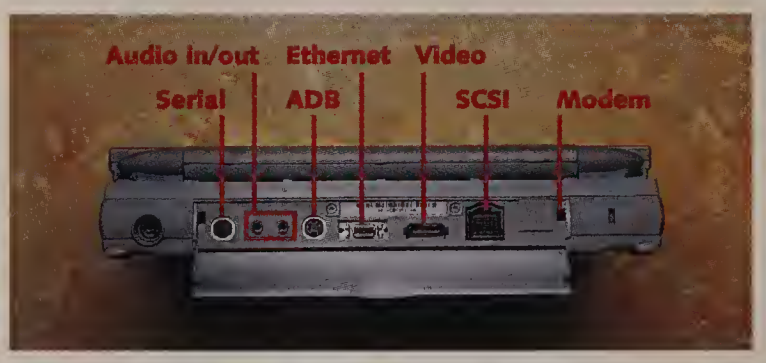
The new PowerBooks are about one and a half to two times as fast as the current 100-series PowerBooks (see "68040 PowerBooks Speed Test," for specific testing results). Overall, performance is about equal to that of Intel 486–based notebooks. The 500-series systems aren't the fastest 040 PowerBooks, however. The new 040 PowerBook Duos, the 280 and 280c, outperform the 500 series because the Duos have faster video circuitry (see "The 040 Duos—The Fastest PowerBooks").

The 68LC040 CPU processor lacks the floating-point unit (FPU) of the full 68040 CPU used in some desktop Macs. An FPU has little effect on applications such as word processors, page-layout programs, database managers, and, for most users, spreadsheets. However, in Macworld Lab's tests on FPU-intensive tasks (mathematics software, CAD, some graphics programs, and spreadsheet calculations involving transcendental functions), 030-based PowerBooks with a coprocessor (165c, 180, 180c) outperformed the 040 PowerBooks. For such numeric processing, an Intel 486–based laptop runs faster still (see "68040 PowerBooks Speed Test"). Expect third-party upgrade specialists to take on the task of unsoldering the CPU and replacing it with a full 68040 chip. The extra power and heat load of the FPU may limit your CPU options, however. According to Apple, a full 25MHz 68040 with an FPU will meet Apple's heat-dissipation guidelines for the PowerBook case, but a 33MHz 68040 with an FPU will not. Also, the 040 processors run only at their rated 25MHz and 33MHz speeds; unlike the 030 CPUs in PowerBooks, the 040 processors cannot be slowed down to 16MHz.

When Apple talks about the 68040 performance of the new PowerBooks, expect to hear the term *clock doubling*. All 68040 CPUs, whether in desktop Macs or PowerBooks, have always used a clock-doubling technology similar to the clock doubling in Intel 486DX/2 CPUs. The 25MHz 040 actually operates internally at 50MHz; however, the system bus and motherboard can process data at only half that speed—25MHz. Intel has marketed the clock-doubling features of its DX/2 CPU for the last couple of years. Apple is finally responding and pointing out this inherent capability of 68040 processors.



Full-Size Keyboard The new PowerBooks offer a full-size keyboard for typing. There's also a row of function keys as well as escape and power-on keys along the top row. Missing are page up and page down keys.



Ethernet for Everyone In addition to ADB, sound-in and -out, video-out, and SCSI ports, the new PowerBooks all feature a built-in Ethernet port. The new notebooks have only a single serial port, which supports LocalTalk.



Take Control Apple's new modular Control Strip control panel provides battery-status information and quick access to common PowerBook functions. It runs on all PowerBooks, although the twin-battery indicators and remaining-battery-life indicator work only on the 500-series models. You can add or remove modules that you need and shrink the entire display to a small tab.

It's OK to Point

The most obvious change in the new PowerBooks is the trackpad, a flat rectangular patch that replaces the trackball. You operate the trackpad with your finger. Underneath the pad is a rectangular array of capacitance sensors that track your finger as you move it around. It's a relative-motion device; that is, if you run into the edge of the pad, you simply pick up your finger and put it back anywhere on the pad, much as you would lift a mouse that you've run off the edge of a mouse pad. Users will have different reactions to the trackpad. You'll have to give it your full attention for at least five minutes to get a fair sense of how it works.

The trackpad requires the capacitance of your flesh and blood to operate, just like the buttons in many elevators. Your fingernail, a pen, or a stylus will not work; you need to use your finger, fingerprint side down. A large, single "mouse" button sits in front of the pad. You might expect tapping the trackpad to serve as a mouse-click, as it does with most drawing tablets for the Mac. It doesn't. You must use the button, typically with your thumb while your forefinger strokes the pad. The trackpad is not pressure sensitive, although it can detect the size of your fingerprint; future versions might be able to use this information to detect how hard you are pressing down.

The trackpad has no moving parts and nothing to clean. It detects 387 points per inch, so it responds to very small finger movements by locating the center of your fingerprint (see "How the Trackpad Works").

You use the new Trackpad control panel to set the trackpad's characteristics, in the same manner as you use the Mouse control panel, which is still included with the 040 PowerBooks. So if you plug in a mouse, you can adjust the two pointing devices independently. This is an improvement over 100-series PowerBooks, in

which the Mouse control panel sets both trackball and mouse simultaneously.

Double Your Battery Life

If you've been frustrated by the battery life of the 100-series PowerBooks, you'll be happy to hear that the 500 series uses high-capacity NiMH batteries. The new PowerBooks accept either one or two batteries, using left and right battery compartments (you flip the battery over when switching sides). Apple ships the 540 and 540c with two batteries; the 520 and 520c ship with one battery.

If you use two batteries, the PowerBook drains the left battery first and then automatically switches over to the right battery. Draining power from one battery at a time simplifies battery management; you can be sure that the left battery is drained and ready for recharging when the computer switches to the right battery. However, this technique forfeits 5 to 10 percent of the potential battery life. All batteries can run for more than twice as long if the current drain is cut in half. If two batteries that drain one after the other last four hours, the same two batteries drained simultaneously at half the current will run for about 20 minutes longer.

When you store the battery, a sliding cover hides the battery's contacts, so you don't need to bother with a battery-storage case. Unlike the metal cover that protects the magnetic media in 3.5-inch floppy disks, the slider doesn't work automatically; you have to move it manually before you insert the battery.

Apple calls the new batteries intelligent because they contain a small processor that communicates to the PowerBook the specific type of battery, voltage, temperature, current, and capacity, all of which change as the battery ages. This information makes it possible to estimate more accurately the PowerBook's performance and remaining capacity. With NiCad batteries, there is no way to accurately estimate remaining battery life because the only information available is the voltage. Even the intelligent estimates can't be completely accurate, however, since the way you use the PowerBook can change dramatically from minute to minute. NiMH batteries tend to be expensive to begin with, and the new PowerBook batteries with this additional circuitry will sell for $120 each. The new PowerBook models also include a Control Strip control panel that displays power information (see the screen image "Take Control"). The Duos use the same battery technology, although neither Duo batteries nor AC adapters are compatible with the 500-series PowerBooks.

If you're using two batteries, you can

The Pull-Apart PowerBook

Unlike the 100-series PowerBooks, the new 500-series notebooks are designed to allow users to get inside easily to add RAM, plug in a PowerPC upgrade card, or install a modem card.

Hard Drive and Bracket
Four screws hold the hard drive to a bracket that in turn attaches to the chassis by two more screws (not shown). It's easy to remove the hard drive for repair or replacement.

RAM-Expansion Card
You add RAM by installing a RAM card in a slot on the CPU card.

CPU Card
The 68040 CPU resides on a daughterboard that plugs into the motherboard. To upgrade to a PowerPC processor, you simply replace the CPU card with the new PowerPC CPU card.

Modem Card
A separate slot on the motherboard accommodates a modem card.

PCMCIA Adapter
You can plug a PCMCIA or a PDS adapter into the left-side battery slot to gain access to either type of peripheral.

Full-Function Keyboard
Remove two screws (not shown) from underneath the unit, and the keyboard comes off.

NiMH Batteries
The slots on either side of the new PowerBooks also accommodate two NiMH (nickel–metal-hydride) batteries. The left-side battery compartment also accepts a PCMCIA or PDS adapter.

Trackpad
The 500-series PowerBooks feature a trackpad, rather than the familiar trackball, and a curved palm rest.



change one at any time. If you're using one battery, the computer holds its RAM for three minutes during sleep while you change the battery. For older PowerBooks, to switch internal batteries without losing the contents of RAM, you need a small external battery source to provide power while you make the switch.

The new 40-watt AC adapter consists of two 20w adapters in a single case (the old adapters were 15w, 17w, and 24w). It can charge one battery while supplying power to the computer. A PowerBook can charge a battery in about two hours. If the PowerBook is shut down or asleep, two spent batteries can be charged in two hours.

The Versatile Left-Side Slot

The left-side battery compartment is also a multipurpose slot that contains a PDS connector in addition to the battery connector. You can leave the left compartment empty (with a dust cover) to save weight (0.8 pound per battery); put in a second battery to double the battery life; or install a hardware accessory such as a cellular modem, data-acquisition device, or the like.

You can also plug an adapter (about $200) into the left-side battery slot and make the 500-series PowerBooks the second Apple product to offer PCMCIA capability (the Newton, of course, was the first). The adapter will take two stacked PCMCIA 5mm-thick Type II cards or one 10.5mm-thick Type III card.

Type II PCMCIA cards typically offer flash memory (a kind of RAM that behaves somewhat like a hard drive, storing information without continuous power), network interfaces, and even mainframe interfaces. Type III cards can, for example, hold a small, 1.8-inch hard drive or a radio communication device. Some PCMCIA cards that are common for DOS/Windows notebooks—system memory enhancements and Ethernet cards, for example—aren't necessary for a PowerBook. A modem card isn't essential for PowerBook users either, but one could be an attractive option for a company that wants to swap modems among a fleet of PowerBooks.

Will PCMCIA cards produced for DOS/Windows notebooks work in a PowerBook? Maybe. At first, Apple says, expect only a small number of cards to work. Apple hopes to convince many card vendors to supply software drivers and possibly make card changes so a wider range of PCMCIA cards will work with the 500-series PowerBooks.

Bigger, Better Display

All four 500-series PowerBooks sport 9.5-inch-diagonal, 640-by-480-pixel screens that display 84 dots per inch. If you're familiar with the 8.4-inch color screen of the PowerBook 180c, you'll notice a big difference in the 500's screen real estate.

The 520's passive matrix screen shows 16 levels of grays; the 520c displays 256 colors. While Apple has always used dual-scan passive matrix LCDs in its monochrome PowerBooks, the 520c is the first color passive matrix PowerBook to use dual-scan technology. Toshiba and Sharp, among others, have used color dual-scan screens in DOS/Windows notebooks for about year. A dual-scan screen is actually two displays with independent scanning circuits butted together. Since a dual-scan screen refreshes twice as fast as a traditional passive matrix screen, the result is a sharper image.

If you've seen the PowerBook 165c, you'll notice that the 520c has distinctly better contrast and a wider viewing angle. Although it doesn't match an active matrix screen, a dual-scan color screen produces good images that you won't mind working with all day and showing off without apology.

The 540's active matrix screen supports 64 shades of gray. The 540c offers 256 colors in 640-by-480-pixel mode or up to 32,000 colors in 640-by-400 mode. The capability to offer both 8-bit and 16-bit color was introduced last October with the Duo 270c. In 16-bit mode, the 640-by-400 image is centered in the middle of the screen with a black band above and below. Unlike with the 270c, you can switch between the two image sizes on the fly without restarting the 540c. Note, however, that software already running when you switch resolutions will not readjust for the screen's size change; the effect of going to a smaller, more colorful screen size is that the PowerBook cuts off the bottom 80 rows of pixels, which can eliminate an essential button or leave windows extending beyond the active screen. For most applications (those with resizable windows), restarting the PowerBook cures window-size glitches.

All 500-series PowerBook screens—including the color ones—use a single backlight, which consumes less power than the twin backlights used in 100-series PowerBooks. Apple estimates the

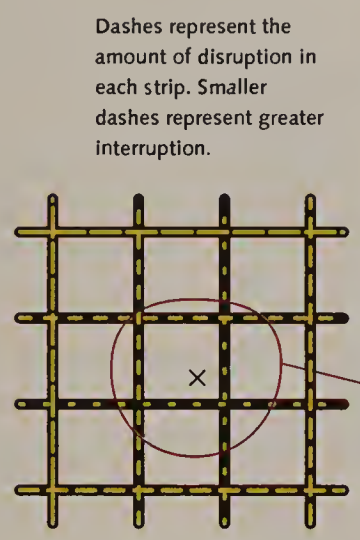
Apple's 040 PowerBooks at a Glance

PowerBook Model	CPU	Configuration (RAM/hard drive)	Maximum RAM	Display Type	Grays and Colors	Screen Resolution	Battery Life (one battery)
520	25MHz 68LC040	4MB/160M8	36M8	9.5-inch passive matrix	16 grays	640 × 480	2.5–4 hours
520c	25MHz 6BLC040	4MB/160M8	36M8	9.5-inch color passive matrix	256 colors	640 × 480	2.5–4 hours
540	33MHz 6BLC040	4M8/240M8	36MB	9.5-inch color active matrix	64 grays	640 × 480	1.5–5 hours
	33MHz 68LC040	12MB/240MB (with modem)	36MB	9.5-inch color active matrix	64 grays	640 × 480	1.5–5 hours
540c	33MHz 68LC040	4M8/320M8	36M8	9.5-inch color active matrix	256 colors or up to 32,000 colors**	640 × 480 (256 colors); 640 × 400 (up to 32,000)	1.5–5 hours
	33MHz 68LC040	12M8/320MB (with modem)	36MB	9.5-inch color active matrix	256 colors or up to 32,000 colors	640 × 480 (256 colors); 640 × 400 (up to 32,000)	1.5–5 hours
Duo 2B0	33MHz 68LC040	4M8/240M8	40MB	9-inch active matrix	16 grays	640 × 400	2–4 hours (Type 1 battery)
	33MHz 68LC040	12M8/240M8 (with modem)	40MB	9-inch active matrix	16 grays	640 × 400	2–4 hours (Type 1 battery)
Duo 2B0c	33MHz 6BLC040	4M8/320M8	40M8	8.4-inch color active matrix	256 colors or up to 32,000 colors**	640 × 480 or 640 × 400	2–4 hours (Type 1 battery)
	33MHz 6BLC040	12M8/320MB (with modem)	40M8	8.4-inch color active matrix	256 colors or up to 32,000 colors	640 × 480 or 640 × 400	2–4 hours (Type 1 battery)

*NA = not applicable. *Weight includes two batteries. **In 8-bit mode, the PowerBook 540c and Duo 280c display 256 colors in 640 × 480 pixel resolution. In 16-bit mode, the 280c displays*

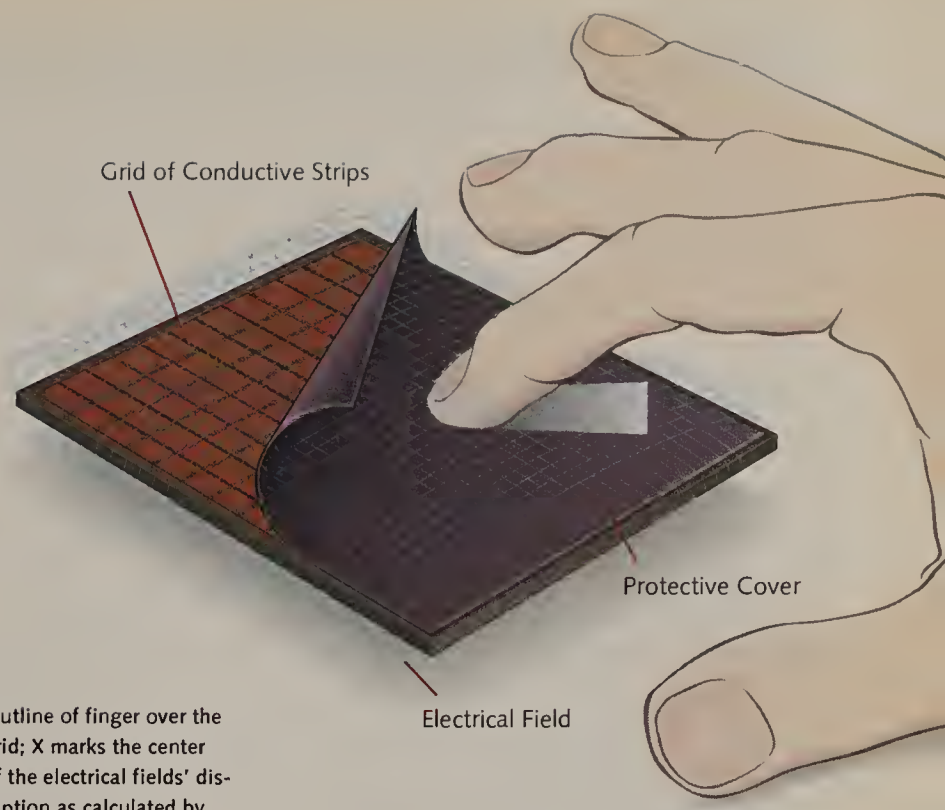
How the Trackpad Works

In Apple's new 500-series PowerBooks, a small, flat, rectangular trackpad replaces the trackball used in 100-series PowerBooks. The trackpad uses capacitance sensing, just like the touch-sensitive buttons in a modern elevator. Instead of the elevator button's single sensor, the trackpad has a grid of conductive strips. Controlling circuits put out high-frequency signals along the strips and sense changes in the electrical field for each strip. This electrical field emanates through and above the surface of the pad. Placing your finger on the trackpad surface disrupts the electrical field for several of the conductive strips. Sophisticated software and hardware calculate the center of this disturbance. By scanning the strips rapidly, the trackpad's circuitry follows the movement and speed of your finger. The trackpad can detect 387 points per inch, so it can track very small movements. Like a mouse, the trackpad is a relative-motion device; when you raise your finger and put it back anywhere on the pad, the cursor stays put.



Dashes represent the amount of disruption in each strip. Smaller dashes represent greater interruption.

Outline of finger over the grid; X marks the center of the electrical fields' disruption as calculated by the trackpad.



same minimum battery life for color and gray-scale models. However, the gray-scale PowerBooks have distinctly brighter screens (at maximum brightness) than the color models do. Set to the same screen brightness as the color PowerBooks, the gray-scale models should run about 15 percent longer.

The new PowerBooks support the same external monitors as before, up to 16 inches in 256-color mode. VGA and SVGA monitors are still driven at a flickery 60Hz and 56Hz, respectively.

Mega RAM

The 500-series PowerBooks accept up to 36MB of RAM, a big step up from the 8MB or 14MB limit of the 100-series PowerBooks. All models have 4MB of RAM soldered onto the CPU daughterboard. Additional RAM goes in a plug-in RAM card. Apple will offer an 8MB card (about $400); third-party memory-card vendors will supply cards in many capacities.

The memory consists of the low-power dynamic RAM used by Duos, although Duo memory cards are not compatible. Apple expects the RAM cards will be compatible with the PowerPC upgrade, but cannot confirm this until the upgrade is built.

The RAM stays alive only during power-on and sleep, so you have to create and save your RAM disk during start-up and shutdown. Apple includes persistent RAM disk software, but you cannot perform a cold start from a RAM disk; you have to start up from the hard disk, load the RAM disk (automatically), and restart.

Battery Life (two batteries)	Weight (standard configuration)	Price
4–7 hours	6.3 pounds	$2000–$2200
4–7 hours	6.4 pounds	$2600–$2900
3–6 hours	7.1 pounds*	$3000–$3300
3–6 hours	7.1 pounds*	$3600–$3900
3–6 hours	7.3 pounds*	$4000–$4500
3–6 hours	7.3 pounds*	$4800–$5200
NA	4.2 pounds	$2500–2650
NA	4.2 pounds	$3000–$3150
NA	4.8 pounds	$3300–$3600
NA	4.8 pounds	$3800–$4100

thousands of colors in 640 × 400 pixel resolution

The Sound of CD Music

The 500-series PowerBooks' sound input and output are true stereo 16-bit sound that provides CD-quality 44.1kHz sampling range, a tremendous improvement over the monaural 8-bit sound with 22kHz sampling in the earlier PowerBooks. The sound-input and -output jacks are standard stereo minijacks; the sound-input jack takes line-level signals directly from a stereo system, rather than microphone-level signals as in earlier PowerBooks. The built-in microphone is, however, monaural. Stereo speakers, suitable for a modest presentation, sit in the corners of the screen lid on all 500-series models. They don't produce hi-fi sound, but they are good enough to delight or irritate an airplane seatmate. Through a stereo system, the sound quality is excellent when recorded and played back at highest quality (10MB per minute).

The Keyboard of a Desktop Mac

The 520, 520c, 540, and 540c are the first PowerBooks to offer full-size Macintosh keyboards—at least in the main typing area—with the same key spacing as on a desktop keyboard. This is possible because the new 500-series cases are slightly wider than previous PowerBook cases. (The 100-series PowerBook keyboard is 97 percent of full size; the Duo's is 88 percent.) An extra row of small keys runs along the top—an escape key, function keys F1 through F12, and a power-on key. The power-on key works like a desktop Mac's, so you no longer need to reach around to the back to power up your PowerBook. Remote-control devices can turn on the new PowerBooks from an ADB port (to turn on the computer with a phone call, for example). Moving the escape key to its normal position at top left leaves space for larger control, option, and ⌘ keys to the left of the spacebar. Apple has also added an LED indicator to the caps lock key. Note that function keys F13 through F15 and the home, end, page up, page down, help, and delete keys are missing. The arrow keys remain in an awkward row instead of in an inverted **T** as on the Apple Extended Keyboard. That's a pity because Apple had the space to position the arrow keys correctly.

Ports and Modems

The new 500-series PowerBooks all include an Ethernet port with a standard Apple Attachment Unit Interface (AAUI). And they have a single serial (printer) port that supports LocalTalk; however, they have no external modem serial-port connector. Their other ports are the standard single ADB, SCSI, and video-out. A Kensington MicroSaver slot mates to a security cable.

Apple will offer in the United States and Canada 500-series PowerBook bundles that include a Global Village Communication modem with Global Village software. The modem will also be available separately for $399 from Global Village. This modem operates at 19.2 kilobits per second. The 19.2-Kbps terbo speed is fast today, but it will be surpassed later this year by V.34 (V.Fast) modems running at 28.8 Kbps. The terbo modems can connect to 14.4-Kbps and slower modems. In European and Pacific Rim countries, Apple will sell its own Express Modem II, which runs at 14.4 Kbps for both data and fax, with Apple software. The Express Modem has a programmable data-access arrangement (DAA) that self-configures for the System language; for example, starting up in French configures the modem for the French phone system. New, small DAA adapters can change the country choice, and a North American DAA is available for the first time.

Bundled Software

With all 68040-based PowerBooks (including the new Duo 280 and 280c), Apple is bundling the following software:

- Apple Remote Access client (the server version costs $275). The client software also works with AppleTalk Remote Access server version 1.0.
- PC Exchange to read and write DOS/Windows floppy disks.
- MacLinkPlus/Easy Open Translators, from Dataviz, converts between many common file formats in the DOS/Windows world.
- PowerBook File Assistant, which includes file synchronization and a persistent RAM disk.
- Control Strip, a new control panel with power-management features (see "Take Control").
- Calendar, a basic calendar with several ways to view and track appointments.
- HyperCard 2.2 player.
- A coupon for eWorld software, Apple's online information service, which is scheduled to debut in June.
- PowerTalk (for systems sold with 12MB of RAM in the United States), an electronic-mail management extension developed originally for System 7 Pro.

You cannot upgrade a 100-series PowerBook to one of the 500-series PowerBooks. If you buy a 520, 520c, or 540 and then decide you really wanted active matrix color after all, you can upgrade

MW LAB 68040 PowerBooks Speed Test

Best result in each test. Products are listed in decreasing order of overall performance.

CORE-PERFORMANCE INDEX

Times as fast as a Classic (Classic = 1.0).

Use these standard ratings of overall performance, based on a core test suite, to compare systems across classes.

NOTEBOOK-SYSTEM PERFORMANCE TIMES

Times are in seconds. Shorter bars are better.

Use these results to compare the performance of notebooks for different types of real-world business tasks. The results can be compared with any other *Macworld* Performance Times for notebook systems.

	Common	Scientific	Processor	Drive-Access	Video-Display	Floating-Point
	Typical business tasks in Microsoft Excel and Word that use the Mac's processor, drives, and video display.	We added to the common tasks several scientific calculations (which use floating-point math).	Indicates raw processing power, which affects almost all aspects of performance.	Indicates performance for tasks that rely heavily on the hard drive.	Indicates performance for tasks that depend heavily on screen-redraw speed.	Indicates performance for tasks that heavily use a math coprocessor.
PowerBook Duo 280	11.1	12.1	16	32	44	70
PowerBook Duo 280c	10.3	11.5	17	37	52	69
PowerBook Duo 280c*	9.8	10.9	17	38	92	69
Compaq LTE Lite 4/25c	9.7	23.3	24	42	61	18
PowerBook 540	9.6	10.3	17	35	102	77
PowerBook 540c*	8.9	9.9	18	37	180	77
PowerBook 540c	8.8	9.7	19	35	101	78
PowerBook 520	8.8	9.1	20	33	75	101
PowerBook 520c	7.3	7.9	24	38	119	96
PowerBook 180	5.7	11.2	34	55	85	42
PowerBook Duo 270c	5.6	11.6	37	52	83	40
PowerBook Duo 270c*	5.2	11.0	38	51	152	41
PowerBook 165c	5.1	10.9	36	54	158	41
PowerBook 180c	5.1	10.8	36	52	167	42
PowerBook 145B	4.0	4.1	50	64	96	279
PowerBook 160	3.7	3.8	52	70	108	283

*Tested in 16-bit color mode.

BEHIND OUR TESTS

To gauge the performance of Apple's new 040-based PowerBooks, Macworld Lab compared preproduction versions of the 520, 520c, 540, 540c, Duo 280, and Duo 280c with several models in the PowerBook 100 series using our standard test suite for portable computers. To see how the new PowerBooks compare with notebooks based on Intel 486 CPUs, we also tested a Compaq LTE Lite 4/25c. Our tests are designed to measure several aspects of a computer's performance: its computation strength, its math processing power, its capability to shuffle data to and from the hard drive, and its screen-update speed. To reflect real-world use, Macworld Lab tests are based on applications such as Microsoft Excel, Microsoft Word, and Claris FileMaker Pro.

All PowerBooks were tested in their standard configuration, so the amount of RAM and hard-drive capacities vary among different models. All Duos and the PowerBook 540 were tested with 12MB of RAM. All 500-series PowerBooks were tested with 6MB of RAM. For color models, we set the computer to 256 colors; for gray-scale models, we set the system to 4 bits; and for black-and-white models, we set the system to 1 bit. We tested other notebooks with 4MB of RAM. We included the PowerBooks 180, 165c, 180c, and 160, and the Duos 270 and 270c for comparison, but Apple has discontinued these models.—**Macworld Lab testing supervised by Lauren Black and Danny Lee**

It seems like only yesterday that Apple introduced the PowerBook Duos 250 and 270c. Actually, it was way back in October 1993. Those Duos are gone now, discontinued and replaced by the 280 and 280c. You'll notice that the new Duos are outwardly identical to the 250 and 270c (see "New PowerBook Duos," *Macworld*, December 1993). However, on the inside, the new Duos have a 68LC040 CPU, the same one used in the new all-in-one 500-series PowerBooks.

As with the 500-series PowerBooks, the Duos' 33MHz 040 CPU lacks an FPU. The 280 and 280c come with 4MB of RAM soldered on the motherboard. A plug-in RAM card can hold up to 36MB, for a total of 40MB.

In Macworld Lab tests, the new Duos outperformed equivalent 500-series PowerBooks, most likely because of the Duos' faster video circuitry. While the 280 and 280c may be a little faster than their all-in-one counterparts, the Duos still offer only monaural 8-bit sound as opposed to the snazzy 16-bit stereo sound of the 500-series PowerBooks.

The 4.2-pound Duo 280 has a 9-inch active matrix gray-scale screen with 640 by 400 pixels. The 4.8-pound 280c has an 8.4-inch active matrix color screen with 256 colors in 640-by-480-pixel mode, and up to 32,000 colors in 640-by-400 mode. Like the 540c (but unlike the Duo 270c), the 280c can switch between the two color modes without restarting. However, such on-the-fly resolution switching occasionally causes software glitches, so you may want to restart your Duo after you change resolutions anyway.

All current docking stations and other Duo accessories work with the new Duo models. To transform the mobile Duo into a full-featured desktop Macintosh, Apple has introduced a new version of its desktop docking station. The new PowerBook Duo Dock II includes an Ethernet interface (AAUI connector) and supports 21-inch monitors with 256 colors and 16-inch monitors with thousands of colors. (Final pricing was not determined at press time, but Apple says the Duo Dock II will cost between $700 and $900.) With 1MB of VRAM, the original Duo Dock, which continues in the Duo product line, also supports thousands of colors on 16-inch monitors.

The Duo Dock II includes two features used only with 030-based Duos: a 32K RAM cache for the CPU, and an FPU. Neither cache nor FPU in any dock works with an 040 Duo. The old Duo Dock can be upgraded to the Duo Dock II for about $400.

Apple will offer an upgrade to convert any Duo into a 280c by changing both the motherboard and the screen. Apple also plans to offer a PowerPC upgrade for the 280 and 280c.



SCREEN IMAGES BY JAMES BENSON/CHECK SIX

Faster Duos The new PowerBook Duo 280 and 280c look the same as the Duo 250 and 270c, which they replace. However, a 68040 CPU makes the new Duos considerably faster than previous models.

Apple ships a new Type III NiMH battery with the 280c. The new battery will work with any Duo and will be available as a replacement battery along with supporting software (about $85). The Type III battery has 15 percent more capacity than a Type II battery; the Type II battery offers 50 percent more capacity than a Type I battery. All three batteries will work in any Duo, but Apple continues to ship the Duo 230 with a Type I battery, and the Duo 280 with a Type II battery; only the Duo 280c ships with a Type III. If you want to buy a replacement battery, Apple offers only the Type III.

Finally, new software gives Apple's Duo Express Modem 14.4-Kbps fax capability, up from the old 9.6-Kbps speed. If you already have a Duo Express Modem, all you need for faster faxing is a software update (which Apple plans to offer for free on online services) and a receiving fax machine or modem able to connect at 14.4 Kbps. The maximum data-transmission rate remains at 14.4 Kbps.

to a 540c (for about $2000); however, 520/520c units remain 25MHz computers even after the upgrade.

Which PowerBook?

If you're shopping for a PowerBook, which one should you buy? For sheer portability, the new 040 Duos run a little faster and are a lot lighter than the 500-series PowerBooks. But if you want to carry a completely self-contained Macintosh with all the standard ports, a 500-series PowerBook beats a Duo.

Based on Apple's preliminary pricing, the 540/540c costs $1000 to $1500 more than the 520/520c. The extra cost buys a faster processor, a larger hard drive, an active matrix screen, and a second battery. If the price gap closes to about $600, the 540s will be a much better buy; until then, it's a difficult choice. When choosing a PowerBook, consider carefully whether you need color. Not only do color models cost a lot more and consume more power than gray-scale models, but also a color display is hard to see outdoors on a sunny day.

The 500-series PowerBooks are superior to the 100 series in every way except price. If you are on a tight budget (or simply prefer the 100-series design), the 145B and 165 or a used PowerBook are your only options.

A more difficult question: If you already have an all-in-one PowerBook, should you switch to a new model? If you have a PowerBook 100, 140, 145, or 170 and need more capabilities, this is a good time to change over. If you own one of the more recent PowerBooks, you probably won't find an urgent need to switch, unless you have run into serious limits in processor speed or battery life. The PowerBook design is so strong that the 100-series notebooks will remain in use for years after competing notebook computers have been stored in closets. But if you are intrigued by the new trackpad and you want longer battery life, faster processing, more RAM capacity, thousands of colors, PCMCIA capabilities, and the option of upgrading to a PowerPC CPU, you won't be disappointed in the new-look 500-series PowerBooks. **m**

Contributing editor CARY LU writes *Macworld*'s *PowerBook Notes* column.

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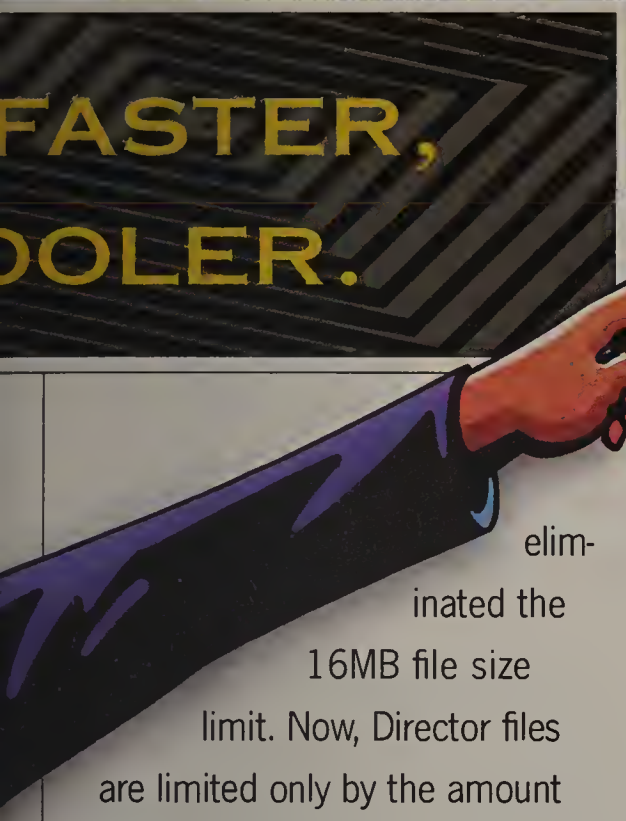
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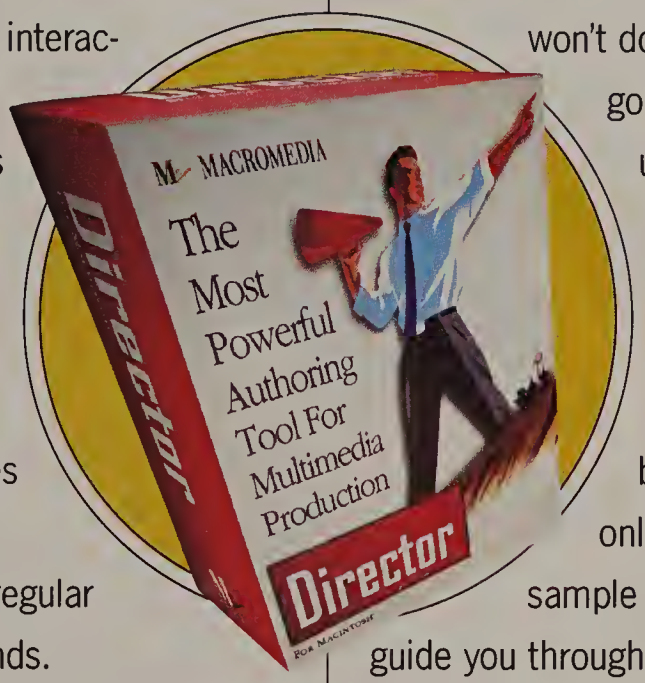
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Circle 21 on reader service card

Top dye-sublimation printers, from top to bottom: The Tektronix Phaser 480, the 3M Rainbow, the Tektronix Phaser IISDX, and the SuperMac ProofPositive Full-Page.

MW LAB

BY JIM HEID

PHOTO-REALISTIC COLOR PRINTERS

MACWORLD LAB TESTS 10 DYE-SUBLIMATION PRINTERS

WHEN YOU WANT IMAGES THAT LOOK AS GOOD ON PAPER AS THEY DO ON THE screen, you want a dye-sublimation printer. Dye-sub color printers are those upper-class scribes whose output looks like a photograph—glossy and vivid, with none of the distracting dot patterns that most other color-printing technologies use to simulate continuous-tone images.

Most people who print color presentation materials rely on less-expensive thermal-wax or ink-jet printers. But some applications, including professional publishing, digital photography, and scientific and medical imaging, demand dye-sublimation's photo-realism.

For this roundup, Macworld Lab tested ten printers. Overall, the latest machines produce better output and operate much faster than the eight models I examined last year (see "Dye-Sublimation," *Macworld*, May 1993). They're also less expensive, although prices haven't fallen as dramatically as they did in 1992.

The past year has also brought the first personal dye-sub printer. Fargo Electronics' Primera Color Printer, also sold by NuDesign, sells for less than $1450. The machine has some serious limitations, but that low price tag goes a long way toward offsetting them.

The Primera can also operate as a thermal-wax machine, as can a new high-end printer from Seiko Instruments, the Professional ColorPoint 2 PSF Model 14. This may be a new trend: versatile hybrids that let you choose between dye-sub photo-realism and the lower operating costs of thermal wax.

Of Pigments and Paper

Both thermal-wax and dye-sub printers use heat to transfer pigment from a plastic ribbon to the paper. The ink ribbon contains successive panels of pigment in cyan (C), magenta (M), yellow (Y), and, optionally, black (K). (Many printers accept either three- or four-color ribbons. A three-color ribbon produces blacks that are a composite of CMY. Three-color printing is faster and more economical, but four-color printing produces richer, often sharper blacks.)

A dye-sub printer's print head contains thousands of heating elements, each of which produces different temperatures, allowing the printer to apply varying amounts of pigment. After the printer has applied one color's dots, the print engine draws back the paper for the next pass. Maintaining accurate registration for each pass requires precise paper feeding—one reason these machines are costly.

Thermal-wax printers use opaque wax that, when melted, sits on top of conventional (although extremely smooth) paper. Dye-sub machines use transparent dyes that the print head converts from a solid to a gas in a process called sublimation. The gaseous pigment is absorbed by paper coated with a polyester resin. As it soaks into the polyester, each puff of dye bleeds slightly, causing the dots to merge. These fuzzy-edged dots contribute to a dye-sub printer's continuous-tone talents.

All dye-sub papers are similar, but some printers use a heavier stock that looks and feels like photographic paper.

TESTING OUTPUT ACCURACY



ORIGINAL IMAGE



SUPERMAC PROOFPOSITIVE FULL-PAGE



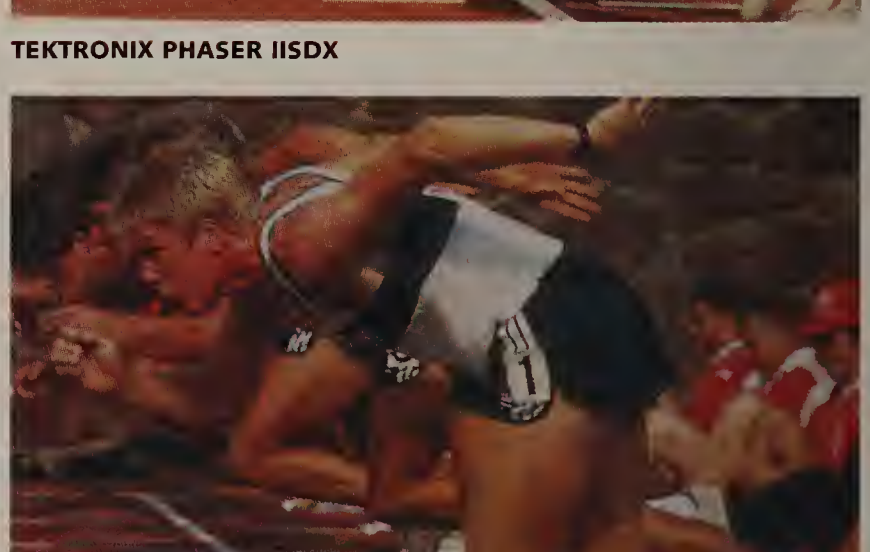
KODAK COLOREASE PS



TEKTRONIX PHASER IISDX



SONY UP-D7000



FARGO PRIMERA

How accurately can dye-sublimation printers reproduce a photo? These images show the broad range of quality variations as compared against the original image (top left). The SuperMac's output (top right) shows extraordinarily sharp details, as seen in the folds in the runner's shorts and the crumpled quality of his shirt. The Kodak ColorEase PS (middle left) shows good color fidelity, in contrast to the yellow cast that throws off colors produced by the Tektronix Phaser IISDX (middle right). Despite its 163-dpi resolution, the Sony (bottom left) does well with this image, though it sometimes suffers from jaggies in fine diagonal lines. The Fargo Primera (bottom right), which uses dither patterns rather than blending colors, suffers from banding and posterizing—both symptoms of uneven transitions between colors.

Of the printers tested, machines that use this high-opacity stock include Kodak's ColorEase PS, Tektronix's Phaser 480, SuperMac's ProofPositive family, 3M's Rainbow, and Sony's UP-D7000.

Year by year, laser printers continue to increase resolution—from 300 dpi to 600 dpi and more. No such evolution is occurring in dye-sublimation, due to the soft-edged fuzziness of dye-sub dots. It can be difficult to differentiate between an image printed by a 163-dpi printer and one produced by a 300-dpi machine, although lower-resolution output can exhibit more banding (jarring color shifts) in areas of subtle color transitions. If you print a great deal of text or line art—which benefit from higher resolution—steer away from machines such as Sony's UP-D7000 and toward the 300-dpi pack (see "Features for Photo-realism").

Quality Comparisons

To judge output quality, we assembled a panel of eight staffers from *Macworld*'s editorial and art departments. Each judge compared unlabeled printouts against photographic prints of the original images, looking at highlights, shadows, color accuracy, and text.

The overall winner: SuperMac's ProofPositive Full-Page. Finishing second—first among tabloid-size printers—was Tektronix's new Phaser 480. Other top finishers included the 3M Rainbow (another tabloid machine) and the SuperMac ProofPositive Two-Page.

That the winner's circle is occupied by SuperMac, Tektronix, and 3M shouldn't come as a shock: all three companies know their color science. More to the point, all three firms' printers provide a larger variety of color-matching and color-management features than do their competitors. SuperMac's printers include Electronics for Imaging's EfiColor processor. The 3M Rainbow also supports EfiColor and provides several 3M-proprietary color systems, including one designed to simulate the characteristics of 3M's photographic Matchprints. The Tektronix machines include Tektronix's TekColor matching schemes, which simulate a variety of printing presses. Tektronix's printers also support the EfiColor, Apple ColorSync, and Kodak ColorSense color-management systems.

A dye-sub printer's blurry dots are ideal for continuous-tone images but give text—especially small sizes—a fuzzy, out-of-focus appearance. Photofine technology from Tektronix handles this problem by adjusting the placement of dots in text and line art to compensate for spreading. It works: the Tektronix Phaser 480 and its smaller sibling, the Phaser IISDX, earned high marks for text output. (Don't confuse this feature with text antialiasing, which involves adding faint pixels to the edges of characters to smooth their jagged edges.) GCC Technologies' ColorTone, which finished eighth in overall output quality, also impressed the judges in the text competition. The printers that did the worst job with text were the two low-resolution machines: Sony's UP-D7000 and Fargo's Primera.

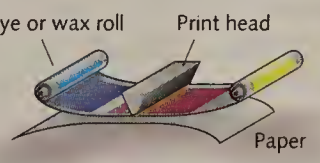
PostScript Variations

Of the ten printers tested, only the Sony and Fargo units do not speak PostScript. They rely on the Mac's QuickDraw graphics language, making their output quality generally unsuitable for printing publishing layouts or illustrations created with programs such as Adobe Illustrator. (Both units work well with Adobe Photoshop and other bitmap-oriented programs, however.)

Within the PostScript clan are several variants, all of which deal with the PostScript interpreter, which deciphers the PostScript-language commands generated by the Mac. Some machines use true Adobe PostScript interpreters, while others use so-called clone interpreters, such as Phoenix Technology's PhoenixPage. Macworld Lab encountered only one

Wax and Dye Printing from One Printer

Dye-sublimation and thermal-wax technologies are similar enough to be combined within a single unit that offers users twice the printing options. Both use a print head with a row of tiny heating elements. Those elements heat spots on rolls of plastic to which colored dye or wax is affixed in alternating blocks of color. Both transfer the colored dye or wax as the paper and color roll contact each other while passing under the print head.



DYE/WAX DIFFERENCES

Wax-head elements always heat to the same temperature, transferring a pixel of wax that's always the same density and size. By dithering pixels of different primary colors, these printers create the illusion of many colors in an image. Wax heads create sharply defined pixels that overlap only enough to ensure that no image-degrading gaps form.

Dye-head elements heat to many temperatures—the hotter the element, the greater the density of dye it transfers. Dye heads print primary colors one on top of another to create a full color spectrum. Dye pixels have wide, soft edges and are darker in the center. Dye printers overlap the edges of pixels to compensate for this.

Wax primary colors

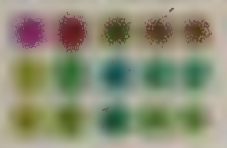


Dye primary colors



DYE AND WAX TOGETHER

If a dye head were used to print wax it would create pixels that overlap too much. Printing dye with a wax head would create pixels that are too small, leaving gaps that degrade image quality.



Wax head printing dye



Dye head printing wax

Seiko's Professional ColorPoint 2 PSF Model 14 (which should be available when this appears) prints either wax or dye from the same head by using smaller elements than either conventional wax or dye print heads. The Seiko unit *double steps* the media, placing two smaller pixels side by side. The double-step process offers greater control over pixel size and placement, yielding wax pixels with sharply defined edges and dye pixels with enough overlap to prevent gaps. When printing dye, element temperature varies as in conventional dye printers. When printing wax the temperature is constant.



Double-stepped dye output



Double-stepped wax output

In contrast, Fargo Electronics' inexpensive dual-mode Primera disregards the subtle differences between dye and wax heads and uses a single temperature for both dye and wax. A dither pattern creates multiple colors in dye as well as wax. This yields output inferior to that of the Seiko method.

STANDARDIZING OUTPUT FROM DIFFERENT PRINTERS



COLORSTREAM/DS PLUS ORIGINAL



COLORSTREAM/DS PLUS CORRECTED



RAINBOW CORRECTED

compatibility problem—with RasterOps' CorrectPrint 300i clone. The company supplied a ROM update that fixed the problems. Just before *Macworld* went to press, Tektronix acquired RasterOps' printing business, however, and promptly removed the CorrectPrint 300i from the market. Tektronix will fully support the RasterOps customer base, and now offers a $2995 upgrade from the CorrectPrint 300i to the Phaser IISDX.

Clones are better than ever, but problems could still surface. A few years ago, many clones choked when Adobe released its Multiple Master font technology. Clone developers have since fixed the problem, but if all other factors are equal, buy the printer with a true Adobe interpreter. Besides, all of this year's best machines use one.

Speed Factors

Next to the relative beauty of their output, the next most critical performance factor for these units is speed. For most of our tests, the Sony UP-D7000 page printer and Tektronix Phaser 480 tabloid printer were fastest in their respective categories by a healthy margin (see "How Fast for Great Color?"). They achieved these commendable results via contrasting approaches. The Sony printer combines a low-resolution (163-dpi) engine with a fast SCSI interface and a simple QuickDraw-based driver, while the Tektronix unit relies on a sophisticated controller containing a fast RISC processor and built-in image processing hardware.

A number of other critical factors determine how fast these printers will operate. Most PostScript-interpreter software is built into ROM chips within the printer itself, but the 3M Rainbow and SuperMac's ProofPositive models use an interpreter that lives on a Mac's hard

Features for Photo-realism

Company	Phone	Toll-free Phone	Product	Tested by Macworld Lab	List Price	Standard Ports/ Optional Ports/ All Active	RAM (base model/ maximum)	Resolution (in dpi)
3M	612/733-1110	800/328-1684, ext. 350	Rainbow	●	$20,000 *	SCSI/**/NA	8MB/**	300
GCC Technologies	617/275-5800	800/422-7777	ColorTone	●	$7999	E, L, P, S/T/●	16MB/64MB	300
Codonics	216/243-1198	800/444-1198	NP-1600 Photographic Network Printer	○	$10,495	E, P/none/●	16MB/96MB	300
Fargo Electronics	612/941-9470	800/327-4622	Primera Color Printer	●	$1445	P, S/none/○	32K/32K	203
Kodak	716/253-0740	800/344-0006	ColorEase PS	● ***	$7999	L, P, S/E/●	16MB/16MB	300
Mitsubishi International	914/997-4999	○	Shinko CHC-S746i ColorStream/DS Plus	●	$15,500	L, P, S, SCSI/E/●	54MB/134MB	300
NuDesign	612/832-5622	800/762-3531	NuDesign Color Printer	○	$1298	P, S/none/○	32K/32K	203
Seiko Instruments	408/922-5800	800/873-4561	Professional ColorPoint 2 PSF Model 14	○	$16,495	L, P, S/E, T/●	24MB/136MB	300
Sony	201/930-7796	○	UP-D7000	●	$8995	SCSI/none /NA	7MB/7MB	163
SuperMac Technology	408/541-6100	○	ProofPositive Full-Page	●	$7999 ****	SCSI/**/NA	**/**	300
			ProofPositive Two-Page	●	$14,999 ****	SCSI/**/NA	**/**	300
Tektronix	○	800/547-8949	Phaser IISDX	●	$9995	L, P, S/E, T/●	32MB/64MB	300
			Phaser 480	●	$14,995	L, P, S/E, T/●	32MB/64MB	300

Technical-support ratings are based on a series of calls made to each company by Macworld staffers (posing as customers) to gauge the accessibility, helpfulness, and accuracy of the company's support products Macworld Lab tests. ● = yes; ○ = no; *NA = not applicable. E = Ethernet, L = LocalTalk, P = parallel, S = serial, SCSI = small computer system interface, T = TCP/IP.* * *Vendors' estimated* *** *The XLT 7720 unit, with 11" X 11", L, and A4 paper options, sells for $19,995.* **** *ProofPositive models without PostScript are also available for $6999 (Full-Page) and $12,999 (Two-Page).*



RAINBOW ORIGINAL

Businesses that use more than one color printer sometimes want to obtain a high degree of color fidelity across printers. EfiWorks offers a method of making different printers create similar-looking output. The uncorrected images (far left and immediate left) show substantial color differences, particularly evident in the bold reds, greens, and blues of the runners' uniforms, and in the cinder track. In contrast, the images corrected with EfiWorks (the two central images) look much more similar to each other.

OUTPUT SAMPLES: DUOMO PHOTOGRAPHY

drive. These machines use Adobe's Configurable PostScript Interpreter (CPSI) Level 2. CPSI accepts PostScript commands from the Mac's printer driver, interprets them, and then transmits the bits that represent the page to the printer, which is connected to the Mac's SCSI interface.

This approach has good and bad points. On the plus side, you can improve the printer's performance over time by upgrading the Mac on which CPSI is running—a potentially significant advantage in the color world, where every bit of speed helps. This plus is likely to become even more significant with Adobe's native PowerPC version of CPSI, which should be available by the time you read this.

And like a printer with a built-in interpreter, a CPSI-based printer can be shared on a network. CPSI includes a basic print-server application, but SuperMac also includes a version of the Aldus Color Central utility (sold separately for $3995 by Aldus Prepress Division, 814/238-2120), which provides better control than CPSI over pending print jobs and can decrease printing time and network traffic when printing high-resolution color images.

On the downside, setting aside a Mac to run the CPSI server application adds a few thousand dollars to the printer's effective cost. (SuperMac recommends at least a Quadra 650 with 64MB of memory for best performance.) You can run other programs on the CPSI server, but it may slow unacceptably while processing print jobs. What's more, a Mac's 68040 processor is slower than the RISC processors found in the other PostScript machines tested; the ProofPositive models finished near the bottom in most of Macworld Lab's tests. 3M's Rainbow was generally faster, but still didn't sizzle.

Network Speed Factors

The type of network interface a printer uses also plays a large role in speed, particularly in the color world, where huge image files can cause digital gridlock on LocalTalk networks.

If you primarily plan to print large scanned images, don't even think about attaching a dye-sub printer to a LocalTalk network—not unless you have the patience of Job. You'll need the faster data-transfer rates that Ethernet provides.

To gauge the differences, Macworld Lab tested a Tektronix Phaser IISDX on both a LocalTalk and an EtherTalk network. Performance didn't vary significantly for an Aldus FreeHand document:

Imaging Language	Processor/ Clock Rate	SCSI Port for Font Storage	Number of Fonts	Text Antialiasing	Photoshop Export Module	Paper Sizes	Technical Support
PostScript Level 2 (CPSI)	**	**	35	○	●	A, SA, SB, transparency	acceptable
PhoenixPage Level 2	AM29050/25MHz	yes (includes drive)	35	●	●	A, A4, lgl, SA4	acceptable
Jaws Level 2	Sparc/50MHz	○	35	●	○	A, A4, SA, SA4	not rated
QuickDraw	**	○	0	●	○	A, A4, long A4	excellent
PostScript Level 2	Sparc/ 40MHz	● (includes drive)	35	○	●	A, A4	acceptable
PowerPage Level 2	AM29050/25MHz	●	35	●	●	A, A3, A4, B, SA, SB	unacceptable
QuickDraw	**	○	0	●	○	A, A4, long A4	not rated
PostScript Level 2	i80960CA/33MHz	● (includes drive)	104	○	●	A3, A3 long, B, B long	not rated
QuickDraw	**	○	0	●	optional ($85)	A, A4	not rated (supported through dealers)
PostScript Level 2 (CPSI)	**	**	17	●	●	A, A4, SA, SA4	excellent
PostScript Level 2 (CPSI)	**	**	17	●	●	A, A3, A4, B, SA, SA3, SA4, SB	
PostScript Level 2	AM29000/24MHz	●	39	●	●	A, A4, lgl	excellent
PostScript Level 2	AM29000/24MHz	●	39	●	●	A, A4, B, lgl, SB	

technicians. Macworld uses a point system, including bonuses and demerits, to derive the final rating. Ratings are for companies, not individual products, and we call only those companies whose street price; no list price available. ** *These printers rely on the host Mac to process print jobs and store fonts. Any network interface available on the host Mac is available to the printer.*

object-oriented illustration programs don't ship megabytes of data across a network. Where we did see the EtherTalk advantage was with a 7MB Adobe Photoshop image: a file that took 4.5 minutes to print via EtherTalk took more than 9 minutes to print over LocalTalk.

Only two of the PostScript printers tested include a built-in EtherTalk interface: GCC's ColorTone and Tektronix's Phaser IISDX. EtherTalk is an extra-cost option for the Kodak ColorEase PS ($495) and the Tektronix Phaser 480 ($695). The 3M Rainbow and SuperMac ProofPositive machines connect to the host Mac via SCSI; to get the best performance when using these printers on a network, you should run CPSI on an EtherTalk-equipped Mac. EtherTalk is also a $700 option for the Seiko Instruments Professional ColorPoint 2 PSF Model 14.

Connecting a hard drive to a PostScript printer is another way to improve performance and decrease network traffic. The hard drive can store fonts that would otherwise have to be downloaded over the network. GCC's ColorTone and Kodak's ColorEase PS each contain a hard drive, as will Seiko's Professional ColorPoint 2 PSF Model 14. The remaining embedded-PostScript machines have a SCSI port for an external drive.

With the 3M Rainbow and SuperMac ProofPositive models, all fonts are stored on the CPSI Mac's hard drive. Version 2.0 of SuperMac's ProofPositive family, which should be available by the time you read this, will also accept a dedicated hard drive that will hold the bitmap of the most recently printed job. This feature will enable you to reprint a document without having CPSI reprocess it—an important time-saver.

If you anticipate a lot of printing within Adobe Photoshop, look for a printer that includes a Photoshop export module, which bypasses the Mac's PostScript driver and sends the image's RGB or CMYK data directly to the printer. In our tests the Tektronix Phaser 480 needed only about three-fourths as much time to print using the module as it needed using the driver. Note, though, that quality may suffer if you print images whose resolution is greater than 300 dpi. Among all the export modules we tested, only the 3M Rainbow's was able to scale down a 400-dpi image to 300 dpi without introducing distortion. Export modules come with all the machines tested except Fargo's Primera and Sony's UP-D7000 (Sony sells an optional export module for $85).

Combination Platters

Thanks to that polyester-coated paper, dye-sub output is the costliest in the color world. Letter-size output costs roughly $2 to $5 per page, while tabloid-size pages cost about $7. Thermal-wax output costs less than a dollar for a letter-size page, and about a buck for a tabloid-size one.

This is one reason the dual-media approach of the Fargo Primera and the Seiko Professional ColorPoint 2 PSF Model 14 is appealing: you can choose the imaging technique appropriate to the document's quality requirements (see "Wax and Dye Printing from One Printer"). In the graphics world, it's routine to print numerous tests while refining a lay-

MW LAB How Fast for Great Color?

Best result in each test. Printers are listed by category in decreasing order of overall speed. Times are in seconds. Shorter bars are better.

	PHOTOSHOP-RGB		PHOTOSHOP-CMYK		
	Using Plug-in Print speed for a 7MB, 200-dpi, RGB Photoshop file using plug-in export modules supplied with the printers.	**Using Driver** Print speed for a 7MB, 200-dpi, RGB Photoshop file using the printer's driver.	**Using Plug-in** Print speed for a 9.35MB, 200-dpi, CMYK Photoshop file using plug-in modules supplied with the printers.	**Using Driver** Print speed for a 9.35MB, 200-dpi, CMYK Photoshop file using the printer's driver.	**Page Layout** Print speed for a two-page QuarkXPress 3.2 document (one page for tabloid printers) with three fonts and a 10MB graphic.
Page Printer; I/O Port Used					
Sony UP-D7000; SCSI	211	191	NA	207	442
Tektronix Phaser IISDX; ET	269	412	293	381	603
Kodak ColorEase PS; ET	321	623	352	474	679
SuperMac ProofPositive Full-Page [A,B]; ET	C	689	C	632	964
SuperMac ProofPositive Full-Page [A]; SCSI	280	743	362	671	995
GCC Technologies ColorTone; ET	547	805	543	656	1075
Fargo Electronics Primera Color Printer; S	NA	949	NA	1051	2031
Tabloid Printer; I/O Port Used					
Tektronix Phaser 480 [D]; ET	297	426	310	405	464
3M Rainbow [B, E]; ET	F	708	C	584	732
3M Rainbow [E]; SCSI	C	847 [G]	466	458	960 [G]
SuperMac ProofPositive Two-Page [A]; ET	C	851	C	794	1654
SuperMac ProofPositive Two-Page [A, B]; SCSI	385	858	491	828	1667 [G]
Mitsubishi ColorStream/DS Plus; ET	788 [H]	1683 [H]	I	1116 [H]	4978

ET = EtherTalk; S = serial.

BEHIND OUR TESTS

Macworld Lab gauged printer speed with a variety of documents and techniques, each designed to test performance from a different perspective.

The Photoshop tests measured the printer's ability to handle large bitmapped images as well as network interface performance. We ran both RGB and CMYK tests using the Mac's PostScript printer driver and using the Photoshop Export modules that accompany most of the tested printers. The page-layout test used a two-page QuarkXPress document containing three downloadable fonts with different sizes on one page, and a 10MB graphic on the second page. This test gave the printers a good overall workout and demonstrated how well each machine handles typical publishing jobs.

The Aldus FreeHand document tested the performance of a PostScript printer's controller. The MacDraw Pro document also tested controller processing performance.

To judge output quality, eight staffers from *Macworld*'s editorial and art departments compared four different unidentified printouts against photographic prints of the original images, looking at highlights, shadows, color accuracy, and text.—**Macworld Lab testing supervised by Mark Hurlow**

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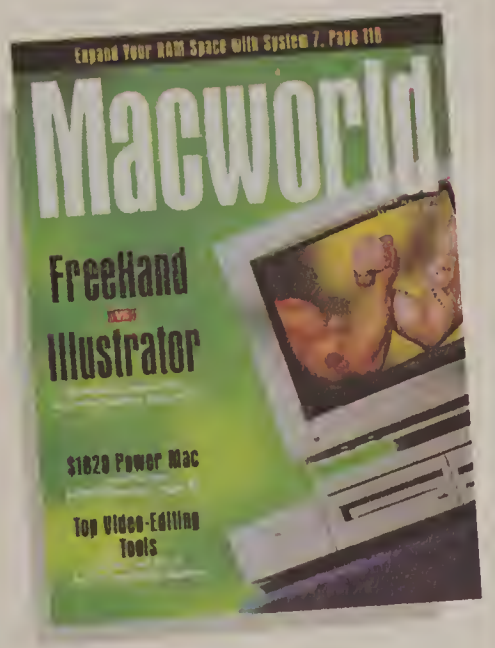
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out's design and typography. Printing these using the thermal-wax ribbon and paper can cut costs dramatically.

In Seiko's Professional ColorPoint 2 PSF Model 14, a sensor determines whether you've installed a thermal-wax or dye-sub ribbon and media and adjusts the print-head temperature and paper-transport speed accordingly. The printer, expected to sell for $16,495, can print tabloid-size pages with bleeds, and it packs an impressive list of features, including a built-in hard drive containing a whopping 104 Adobe fonts. The Model 14 didn't ship in time to be formally tested for this article.

Seiko offers an array of unique thermal-wax media options, including iron-on fabric transfers and static-cling plastic for window signs. This means designers can do small runs of promotional doodads on the same printer they use to produce proofs.

Picking a Printer

What are the top choices this time around? For prepress proofing of tabloid-size jobs, the 3M Rainbow and Tektronix Phaser 480 share first place. Both offer outstanding output and a wide range of color-matching and color-proofing options. The Rainbow is the more complete proofing device; unlike the Phaser 480, it lets you proof traps and overprints. (SuperMac says this capability will also be available in version 2.0 of the ProofPositive line, which should ship by the time you read this.)

The Rainbow costs several thousand dollars more than the Phaser 480, however, and you'll also need to all but dedicate a Mac to running the Rainbow's PostScript interpreter. Besides costing less and being far faster, the Phaser 480 prints text significantly better than does the Rainbow.

If you buy the base-model (32MB) Phaser 480, you'll need to add at least 16MB to the printer to use a four-color ink ribbon. (Tektronix omitted the extra RAM in order to cut the printer's cost for the scientific- and medical-imaging markets, which don't require CMYK printing.) Tektronix's price for the 16MB upgrade is $1595, but the printer uses standard SIMMs, so you might be able to do better. A 32MB upgrade retails for $3190 and provides an overall performance improvement of roughly 20 percent, according to Tektronix. The Phaser 480 tested by Macworld Lab included this 32MB upgrade as well as the optional ($695) EtherTalk interface, bringing the price of the test unit to $18,880.

For letter-size proofing applications, SuperMac's ProofPositive Full-Page takes first place. But keep in mind that for the most critical publishing jobs, there's still no substitute for a photographic proof. Because a proof is made from the same color-separation films that are later used to burn the printing plates, it can show flaws those films might have, such as moiré patterns caused by halftoning.

As for the rest, for the second straight year the $8995 Sony UP-D7000 was the fastest dye-sub printer we tested. Its QuickDraw driver and 163-dpi resolution make it unsuitable for text-oriented jobs, but it is a good choice for electronic photography and digital video applications. The $7999 Kodak ColorEase PS also performed well, although its color accuracy was uneven. The $7999 GCC ColorTone does a better job, although it's slower and its stock isn't as hefty and glossy as Kodak's. The ColorTone also earns points for including an EtherTalk interface, for which Kodak charges extra.

Then there's the $1445 Fargo Primera. It's certainly not in the same league as the rest of the printers tested (although our quality judges ranked its output as superior to Sony's). Technically, the Primera doesn't even produce continuous-tone images: it actually uses a minute but still-discernible dither pattern.

Still, the Primera's output is impressive and more photo-realistic than that of any mainstream thermal-wax or ink-jet machines. The Primera and its repackaged twin, NuDesign's NuDesign Color Printer, are solid, if slow, choices for low-budget electronic photography or digital-video applications. **m**

Contributing editor and *Working Smart* columnist JIM HEID teaches electronic publishing and typography. His latest books are *Macworld Complete Mac Handbook Plus CD* (1993) and *Macworld Word 6 Companion* (1994), both published by IDG Books Worldwide.

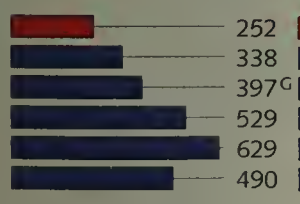
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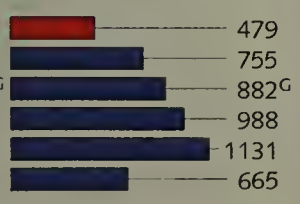
Print speed for a FreeHand illustration that includes special PostScript effects, such as nonlinear blends and Bézier curves.



Object Oriented

Print speed for a complex, color MacDraw Pro document containing more than 840 color objects, most of them gradient-filled.





NA = not applicable.

[A] ProofPositive Two-Page requires extra disk space; we used an external drive as a scratch disk.

[B] Tested with a dedicated Centris 650 server.

[C] Plug-in does not support network printing.

[D] Tested with 32MB RAM upgrade and Ethernet.

[E] 3M recommends 160MB of disk space for better performance; we used an external drive for this.

[F] Plug-in requires file to be in CMYK format.

[G] Combines time to generate the PostScript file and actual print time.

[H] Photoshop plug-in could not resize the file properly, so we resized the image at 300 dpi to obtain correct print size.

[I] Plug-in requires files to be in RGB format.

DYE-SUBLIMATION PRINTERS

MW EDITORS' CHOICE

Photo-realistic printers offer a broad range of high-end–publishing and prepress features, and no single printer is best for every office. We selected the top machines for every major category.

Prepress Proofing—Tabloid Size

Phaser 480 The fastest tabloid-size printer tested also offers the best text quality. Tektronix's technical support was also excellent. You'll need to expand the base model's 32MB of RAM to at least 48MB to print with a CMYK ribbon, however. **Company:** Tektronix. **List price:** $14,995. **Price as tested:** $18,880.

Rainbow It's costlier than the Phaser 480 and requires a Mac to run its PostScript interpreter, but it's the most complete tabloid proofer—and the only printer tested whose Photoshop export module correctly scales down images. **Company:** 3M. **Estimated street price:** $20,000.

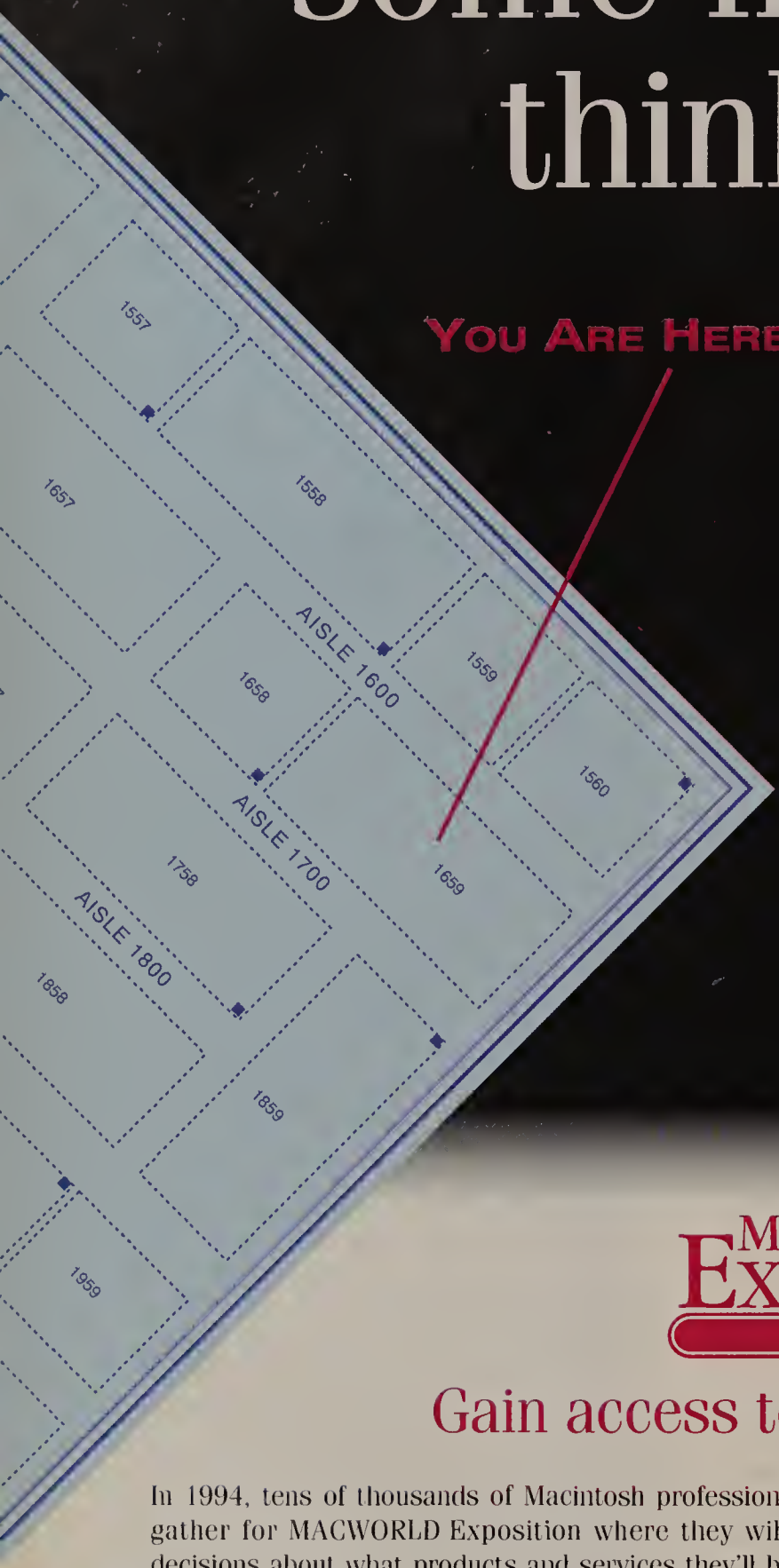
Prepress Proofing—Letter Size

ProofPositive Full-Page This cost-effective machine's overall output quality earned first place among all the printers tested, although its text lacked the sharpness of Tektronix's Phaser IISDX. **Company:** SuperMac. **List price:** $7999.

General Publishing and Business

Phaser IISDX The latest version of the venerable Phaser II is faster than its predecessors. **Company:** Tektronix. **List price:** $9995.

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Circle 74 on reader service card

Circle 75 on reader service card

Macworld Lab tests virus software and survives

Virus Killers

BY BRUCE SCHNEIER

Macintosh users ignore computer viruses at their peril. Viruses can cause irreparable damage to the system or destroy megabytes of data. Fortunately, unlike their biological namesakes, computer viruses are relatively easy and painless to control. With a leading virus-protection software program, it takes only a few minutes a day to remain virus-free.

Macworld Lab tested four antiviral products—the freeware application Disinfectant, Central Point Software's Mac-Tools ($149.95), Symantec's Symantec AntiVirus for Macintosh (SAM, $99), and Virex ($99.95) from Datawatch—against every Macintosh virus known at the time of testing, 52 in all. We also looked at each product's features and measured how fast the programs detected viruses.

We found that all four programs effectively combat the most important and prevalent viruses, but not all could handle certain strains. And the products varied widely in how fast they operate, with Virex blazing a new performance standard for virus detection. At the speed of Virex, dealing with viruses becomes a virtually painless exercise.

Know the Enemy

To understand the relative quality of these products, first take a step back to consider your insidious opponent: computer viruses are software programs. But unlike normal software, viruses operate unseen, on their own initiative, often hiding inside other programs and running when those programs are launched.

Many Macintosh viruses are benign; they simply spread from computer to computer without doing damage. But others erase files and cause other mayhem. Viruses can be spooky because they rarely put up dialog boxes or prompt users for input—once your machine is infected, unseen damage can go on for some time until you notice a problem. By then it may be too late to correct. Other viruses leave files or applications untouched, but cause system incompatibilities that lead to crashes and other problems.

Computer viruses spread by modifying another program to include an executable, and possibly altered, copy of the virus. They enter your machine on removable disks, files downloaded from bulletin boards, files shared on servers, and sometimes even shrink-wrapped software or blank preformatted disks.



Typically, the virus code executes when a user launches the program the virus is attached to. The virus then attempts to infect other programs, thereby reproducing itself. A virus may start reproducing right away, or it may lie dormant until it is triggered by some event (the computer's clock registering Friday the 13th, for example). Some viruses duplicate themselves when you open an infected file. Others infect the system and infect other volumes when you access them.

Performance Variations

All four antiviral programs are easy to install and use. Each consists of an INIT and an application. The SAM interface is slightly more complex—and therefore takes a bit more concentration—than the other products, but this shouldn't cause problems for most users. These are relatively simple applications, and each user interface is relatively easy to use.

All four products did a good job destroying the known viruses that they are designed to detect. Detection is relatively easy because each virus leaves a distinct signature—a string of bytes that uniquely identifies the viral code. Antivirus software merely recognizes these signatures.

When any of these products discovers a known virus, it informs you of the infection and asks if you want the virus removed. Say yes. The program then removes the virus and, to the best of its ability, restores your system to its previral state. We found that once any of the products detects a virus, eradication is 100 percent effective.

Differences between the products emerge, however, in what viruses they can detect (see "Antivirus Performance Factors"). All four detected Macintosh System viruses, the most common and dangerous strain. Only SAM and Virex detected HyperCard viruses, however, so if you routinely use HyperCard those two products represent your only viable options. Disinfectant cannot detect Trojan horses—stand-alone applications that must be launched in order to be activated, and that are similar to viruses in the damage they can cause.

Every virus program can scan files compressed with all driver-level compression products, including Fifth Generation Systems' AutoDoubler and Aladdin Systems' StuffIt SpaceSaver. When it comes to archiving programs, the virus-detection products are less effective. SAM scans archives compressed with both Aladdin Systems' StuffIt series and Compact Pro; MacTools scans Compact Pro archives but not StuffIt archives; and neither Virex nor Disinfectant scans compressed archives. Such deficiencies make it imperative to use other program features regularly to catch viruses that may be released when a compressed file is expanded.

Speed is a critical and clear-cut differentiating factor. Most people scan for viruses with diligent regularity only if the process is convenient and quick. All four products are convenient, but only Virex, with its impressive SpeedScan, is fast. Scanning operations that take SAM upwards of 5 minutes take Virex less than 30 seconds to complete. With Virex it is reasonable to scan your entire hard disk every time you boot up your Macintosh.

Unknown Viruses

Detecting new or undocumented viruses is much harder. Since an antivirus program does not have unknown viruses' signatures to go on, it cannot scan for those signa-

Antivirus Performance Factors

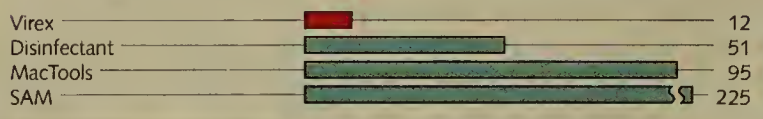
SCANNING SPEEDS

Best result in each test.

Times are in seconds. Products are ranked in decreasing order of overall performance.

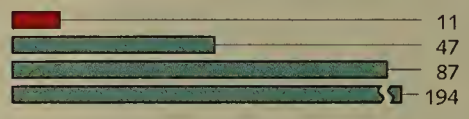
Launched from Floppy Disk

Time to scan hard drive containing 5 apps and 985 files totaling 88.5MB, after launch from a floppy disk.



Launched from Hard Drive

Time to scan hard drive containing 5 apps and 985 files totaling 88.5MB, after launch from the hard drive.



BEHIND OUR TESTS

Antivirus software faces two critical performance questions: How comprehensive is the software's detection filter, and how fast does the product scan your drive? A third factor—how fast the product eradicates the virus—is fairly constant across the four applications tested.

We tested detection speed two ways—launching the antivirus application from the hard drive as a user might do during routine maintenance, and launching from a floppy, as would be necessary before installing the antivirus software or if the System Folder on the hard drive has been infected and disabled. The speed tests were done on a Centris 650 equipped with 8MB of RAM and a 230MB hard drive, using System 7.1 with AppleTalk off and 32-bit addressing on. The drive contained 88.5MB of information, including 985 files and 5 business and graphics applications. Because this test measured scanning speed only, neither applications nor files were infected.

To test the detection filter, Macworld Lab obtained 52 strains of Macintosh viruses, Trojan horses, and HyperCard viruses. We scanned this set with each product. Not every product could detect every virus, but every product successfully eradicated the viruses it could detect.—**Macworld Lab testing supervised by Matthew Clark**

VIRUS-DETECTION SCOREBOARD

✓ = Detects and eradicates

Virus Family *(number of strains)*	Virus Type	Virus Effects	SAM	MacTools	Disinfectant	Virex
ANTI *(3)*	virus	A, C, G, H	✓	✓	✓	✓
CDEF *(1)*	virus	A, H	✓	✓	✓	✓
Code 252 *(3)*	virus	A, D, F, G	✓	✓	✓	✓
Code 1 *(1)*	virus	A, D, F, G	✓	✓	✓	✓
Dukakis [HC] *(1)*	HyperCard virus	A, E	✓	*	*	✓
Frankie *(1)*	virus	A, C, G	✓	✓	✓	✓
INIT 17 *(1)*	virus	A, D, F, G	✓	✓	✓	✓
INIT 1984 *(1)*	virus	B, F	✓	✓	✓	✓
INIT 29 *(1)*	virus	A, C, D, E, F, G, H	✓	✓	✓	✓
INIT-M *(3)*	virus	B, E, F, G, H	✓	✓	✓	✓
MacMag *(1)*	virus	A, D, F	✓	✓	✓	✓
MBDF *(3)*	virus	A, F, G, H	✓	✓	✓	✓
MDEF *(3)*	virus	A, E, F, G, H	✓	✓	✓	✓
MDEF (strain D) *(1)*	virus	A, C, G	✓	✓	✓	✓
MerryXmas [HC] *(1)*	HyperCard virus	A, E	✓	*	*	✓
nVIR *(8)*	virus	A, D, F, G	✓	✓	✓	✓
Scores *(1)*	virus	A, F, G, H	✓	✓	✓	✓
CPro *(1)*	Trojan horse	B	✓	✓	*	✓
Mosaic/FontFinder *(2)*	Trojan horse	B	✓	*	*	✓
Steroid *(1)*	Trojan horse	B	✓	✓	*	✓
Tetricycle [TH] *(1)*	Trojan horse/virus	B	✓	✓	**	✓
Virus Info *(1)*	Trojan horse	B	✓	✓	*	✓
China Talk *(1)*	Trojan horse	B	✓	✓	*	✓
T4 *(5)*	virus	B, F, G, H	✓	✓	✓	✓
WDEF *(2)*	virus	A, H	✓	✓	✓	✓
ZUC *(2)*	virus	A, C, D, G	✓	✓	✓	✓
3 Tunes [HC] *(2)*	HyperCard virus	A, E	***	*	*	✓

A = May cause system errors and crashes.
B = Damages or destroys system or application files.
C = Infects without application launch.
D = Nondamaging effects, such as system beeps, appearance of funny phrases, or bouncing cursor.
E = Infects or modifies document files.
F = Infects or modifies system files.
G = Infects or modifies applications.
H = Infects desktop files and/or Finder.

**Either documentation or vendor has acknowledged that this product will not find this type of virus. **This Trojan horse was not detected, but it releases a virus, MBDF A, which was detected. ***Detected one of two strains; second strain should be detected by later versions of SAM.*

tures. SAM and Gatekeeper (a freeware program available on most online services, often used to supplement Disinfectant) continuously monitor the System for suspicious activity. (Disinfectant can monitor for activity by known viruses and their variants but not by new viruses.) Both SAM and Gatekeeper sit in the background, watching your other applications go about their business. When a virus danger signal pops up—a program writing to the System file, for example—SAM and Gatekeeper post an on-screen alert.

In contrast, Virex uses *checksums*—electronic fingerprints of files on your disk—to determine if a file has been modified, possibly by a virus. MacTools goes a step further, employing both checksums and continuous monitoring.

Both approaches work but can be more trouble than they are worth. When a program detects a possible virus, you then have to decide if there really is an infection or if it's a false alarm. (For example, some applications legitimately alter the System Folder on installation, triggering a suspicious activity alarm.) In general, you have little to base this decision on. False alarms are annoying to experienced users and can cause unnecessary panic among beginners.

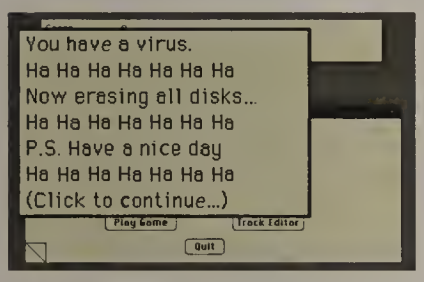
And while both techniques can help you detect unknown viruses, they do not let you determine what virus it is or how to remove it. All you can do is restore your files from preinfected backups. In short, these methods are rarely worth the trouble.

While Intel-based–PC users face many hundreds of viruses and new ones all the time, the odds of a Macintosh user finding an unknown virus are slim. Partly because Macintosh viruses are relatively hard to write (just like legitimate Mac applications), there are relatively few known Mac viruses. Stick to detecting known viruses and you'll be fine more than 99 percent of the time.

Virus-Fighting Options

	Disinfectant 3.3	MacTools 3	Symantec AntiVirus for Macintosh 3.5	Virex 5
Price	freeware*	$149.95	$99	$99.95
Company	NA	Central Point Software	Symantec	Datawatch
Phone	NA	503/690-8088	503/334-6054	919/549-0711
Toll-free phone	NA	800/964-6896	800/441-7234	○
Tested by Macworld Lab	●	●	●	●
Stops infected applications from launching	●	●	●	●
Automatically scans start-up disk (at start-up/at shutdown)	○/○	●/●	●/●	●/●
May prevent unknown viruses	○	●	●	●
Automatically scans floppies and removable media	○	●	●	●
Scans and ejects multiple floppies	●	○	●	●
Contains emergency disk or instructions to create one**	●	●	●	●
Notifies users of new viruses	○	●	●	●
Scans compressed files	○***	Compact Pro***	StuffIt series, Compact Pro***	***

● = yes; ○ = no; NA = not applicable. *Available on the Internet, CompuServe, GEnie, and America Online. **For using to recover from System Folder infections.
***All products scan driver-level compression products.



Panic Attack Some viruses may damage your psyche more than your computer. The message above is a ruse. This virus, a strain of Code 252, didn't actually erase any disks but did cause enough damage to the System file to require reinstallation.

Updating Software Is Vital

Still, the inventory of known Mac viruses is growing, if slowly. For example, after Macworld Lab completed its testing, we learned of two new viruses, Init 9403 and Init 29-B. Init 9403, a highly destructive virus that spreads only through Italian versions of Mac system software, attempts to erase all drives connected to the infected system. This example shows why it is vital that you keep your antiviral software up-to-date. New versions of antiviral software are released days (sometimes even hours) after a new virus is discovered. (All products should have long since added Init 9403 and Init 29-B to their roster by the time you read this.) If you're a registered user of one of the commercial programs, you're mailed a postcard that gives you the signature of the new virus; you have to enter that string into the program.

These signature strings are also available on America Online, on other services in some cases—CompuServe and AppleLink for SAM, and CompuServe for MacTools—and from the companies' own bulletin board services. All three companies can also, for a small fee, send updated software disks to registered users. Disinfectant users can get updated versions on network servers on the Internet, CompuServe, GEnie, and America Online.

SAM is the best antiviral program for network distribution. It allows a central network administrator to automatically install or update SAM on every machine on an AppleTalk network. MacTools requires that each user on a network download the new version from a server, but MacTools has a reporting feature so that an administrator can see which users have updated their antiviral software and which have not. Virex can be installed across a network. It currently has no network updating features, though Datawatch plans to add them in the next version. Disinfectant has no networking features.

Be Alert

Whichever product you select, you'll be safer if you employ some simple preventive antivirus techniques:

- Keep original software on locked master floppies.
- Don't install software on one computer from another computer.
- Make periodic backups of your hard drive, and lock your backup disks. Run your antiviral software before each backup to make certain the backups do not become infected.
- Check all new software—commercial software, shareware, and freeware—for possible infections. Despite the best efforts of vendors and sysops, viruses sometimes slip through.
- Be on the lookout for common symptoms of a virus infection—frequent system bombs for which no explanation can be found; mysteriously malfunctioning applications; disks that are damaged and cannot be accessed; unexplained printing difficulties; distortions in pull-down menus; and windows that do not open, close, or zoom correctly.

Fortunately, you shouldn't run into such problems too often—at least not as a result of viral infections. The Macintosh virus threat has diminished, both in the number of new viruses discovered and the number of reported incidents of infection. This is mostly due to the excellent quality of these four antiviral packages. So viruses can be an annoyance, or even an occasional problem. But if you use a little common sense, they should never become a computing nightmare. **m**

BRUCE SCHNEIER is a computer security consultant and the author of *Protect Your Macintosh* (Peachpit Press, 1994).

VIRUS KILLERS

MW EDITORS' CHOICE

All four antiviral programs operate reliably, but substantial differences in price and speed made the selection easy.

Virex Virex's SpeedScan makes it the fastest antiviral software by a wide margin. Combine that with a detection mechanism that catches every known virus and a price comparable to that of other commercial products, and you have a program that's hard to beat. **Company:** Datawatch. **List price:** $99.95.

Disinfectant Free software is appealing, especially a product as well written as this one. Unless you are concerned about HyperCard viruses or Trojan horses, or need a program with networking capabilities, Disinfectant is a great choice. **Company:** Not applicable. **List price:** Free from online services.

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Circle 28 on reader service card

EDITED BY JAMES A. MARTIN

Graphics

THE LATEST IN DESIGN, PUBLISHING, AND PREPRESS

One-Stop Graphics Shop

NEED A STOCK BACKGROUND IMAGE of coffee beans right this minute? Some new fonts before sunrise? According to International Typeface Corporation, that won't be a problem—as long as you're a subscriber to its Design Palette service. Combining CD-ROMs, search software, and a special SCSI device with a built-in modem, Design Palette gives graphic artists instant, 24-hour access to a variety of electronic stock photos, clip art, fonts, backgrounds, and textures, as well as multimedia tools and utilities.

With an ITC Design Palette credit account you can preview, purchase, and decrypt any graphical element or utility stored on Design Palette CD-ROMs. When the service becomes available in September, ITC expects to offer subscribers a collection of 10 to 15 CDs storing thousands of design items, and will issue new CDs quarterly. The Design Palette software enables you to search the CDs in various product categories. The software tells you the cost of each element and keeps a record of your purchases.

Design Palette requires that you add its external SCSI device to your Macintosh and connect its customized, 2400-bps modem to a telephone line. The SCSI device includes the hardware necessary to decrypt the items stored on the CDs. ITC's computers will dial up each subscriber's SCSI-device modem daily (in the wee hours) and download invoicing information based on that day's purchases.

There will be a small, one-time service fee (around $30) and a required monthly expense minimum, which wasn't set at press time but could be $100 to $200. At press time, ITC would not announce the names of any specific content providers for Design Palette. ITC, 212/371-0699.—J.A.M.



ANDREW FAULKNER

Spreading the News about Trapping

WHETHER YOU USE QUARKXPress or Aldus PageMaker, the process of trapping promises to become easier, thanks to the updated version of Island Graphics Corporation's IslandTrapper, a Quark XTension, and a new Aldus PageMaker Addition.

IslandTrapper 2.0, scheduled to be available in both native PowerPC and 680X0 versions by late June, now offers the ability to set up batch trapping and color separations in QuarkXPress, with help from Island Graphics' new IslandTrapper Quark XTension. You use the XTension to set trapping and color-separation parameters within XPress for all objects (including EPS files) on each page of a document, then send the document to IslandTrapper 2.0. The program performs all necessary trapping functions and color separations based on the parameters set in QuarkXPress. (Previous versions of IslandTrapper did not offer color-separation capabilities.) Regardless of its origin, any EPS file that has been trapped in IslandTrapper 2.0 can then be color-separated by the program.

IslandTrapper for Power Macs is more than four times faster than the

68040-based version, the company says. Both versions are sold in one package for $4495. Users who bought IslandTrapper at the $2195 introductory rate can upgrade to 2.0 for $995; there's no upgrade fee for anyone who paid $4495 for a previous version of IslandTrapper.

Island Graphics has also announced IslandChecker, an electronic checklist utility that alerts service bureaus to missing fonts and continuous-tone images, and offers information on spot and process colors within their customers' EPS files. IslandChecker also lets the designer add annotations directly to a file. The program costs $495 for service bureaus (the price includes ten copies of the designer version); the designer version is available separately for $200.

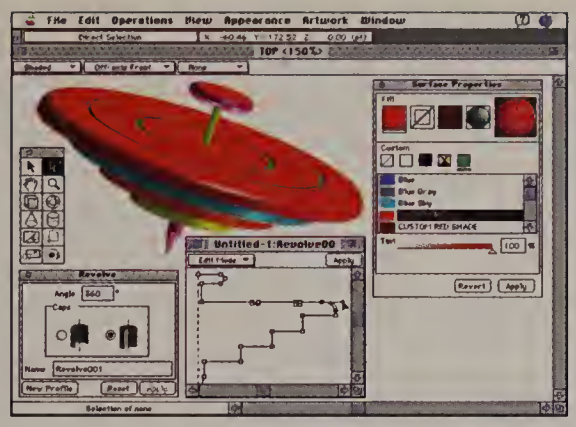
Meanwhile, Aldus has announced a PageMaker Addition (its name wasn't final at press time) that will let both experienced and novice designers perform basic trapping of color images (except EPS graphics) from within PageMaker, using default or customized settings and a few mouse-clicks. More-complex traps can be performed in Aldus TrapWise 2.0 ($4995) or in IslandTrapper. The Addition should be available in late May for under $100. Island Graphics, 415/491-1000, 800/255-4499; Aldus Corporation, 206/622-5500, 800/685-4586.—J.A.M.

PixelCraft Tries Beating the Drum

PIXELCRAFT (FORMERLY BARNEYSCAN) is now shipping the Pro Imager 8000, a single-pass, 36-bit flatbed color scanner that captures reflective and transparency artwork at resolutions up to 4000 dpi—within the same resolution range as some drum scanners.

The Pro Imager 8000 is unusual in that it uses three digital signal processors (DSPs) to speed scanning operations. While most scanners rely on the Mac's CPU to enhance the scanned image, the Pro Imager 8000 uses the DSPs for automatic sharpening, halftone descreening, and thresholding—as well as enhancing the image's contrast during scanning.

The $12,995 scanner supports a maximum image size of 11 by 17 inches and ships with PixelCraft's image-acquisition software (called QuickScan) and ColorAccess for color correction and separations. PixelCraft, 510/562-2480, 800/933-0330.—J.A.M.



Using Adobe Dimensions 2.0's pen tool, you can create 2-D profiles and then revolve or extrude them into 3-D shapes. Custom colors can be imported from Illustrator or created within Dimensions and applied to an object.

Expanding Dimensions

A MAJOR UPGRADE OF ADOBE DIMENsions—a tool for creating simple 3-D objects and type to incorporate into two-dimensional illustrations—will offer artists more control and flexibility in the design process. Version 2.0's more interactive approach will allow you to create 2-D objects within Dimensions, instead of having to import them from a 2-D program, and to view an object in 2-D and 3-D mode simultaneously. With the new pen tool, you'll be able to edit two-dimensional objects while seeing them updated in 3-D, as well as modify extruded or revolved objects without losing their 3-D attributes.

Other new capabilities include creating and editing custom colors, shading objects using any color, and printing from within the application. The program also offers multiple undos, background rendering, and more-powerful blend controls.

Dimensions 2.0 is expected to ship in the second quarter of 1994 and retail for $199. Upgrades are $69 (free for those who registered on or after March 14, 1994). Adobe Systems, 415/961-4400, 800/833-6687.—CATHY ABES



KEVIN CANDLAND

PixelCraft's new Pro Imager 8000 flatbed color scanner is one of the first to include three DSPs for fast scanning operations.

IN BRIEF

■ **To Scitex and Back** Taking PostScript files to a Scitex service bureau used to be a one-way street. But in addition to accepting PostScript files, Scitex America has announced that files created or manipulated on a Scitex Whisper workstation can now be saved in Adobe Illustrator EPS format, enabling Mac-based designers and illustrators to proof or archive final files. 617/275-5150.

■ **Supporting ColorSync** Apple Computer, Adobe Systems, Agfa, Eastman Kodak, Microsoft, Silicon Graphics, Sun Microsystems, and Taligent have formed a group called the ColorSync Profile Consortium (CPC). By joining the CPC, the companies agree to support Apple's ColorSync 2.0 in their operating systems and color-management products, and to ensure their ColorSync-capable products are compatible across platforms.

■ **Agfa Manages Color** Agfa's FotoTune Pro software, due in August, will characterize any output device to ensure that colors on a computer screen match those of the final output. FotoTune is Agfa's device-independent color-management system; FotoTune Pro uses Agfa's ColorTags color profiles, now available on CompuServe. Pricing wasn't available at press time. 508/658-5600.

■ **Roaring RIP** SuperMac Technology's ProofPositive 2.0 PostScript Level 2 dye-sublimation printer includes a hardware buffer, which frees up the Mac while an image is being printed; improved RIP performance; and a lower price ($6999; $14,999 for the two-page system) than SuperMac's original ProofPositive. 408/541-6100, 800/334-3005.

■ **Photoshop Gets a Charge** DayStar Digital's updated Charger Suites Volume 1 software promises to boost Adobe Photoshop filter speeds up to 50 percent for the digital signal processor (DSP) boards it supports. Version 1.5 of Volume 1 ships free with DayStar's DSP products; it sells separately for $119; as an upgrade it costs $49. 404/967-2077, 800/962-2077.

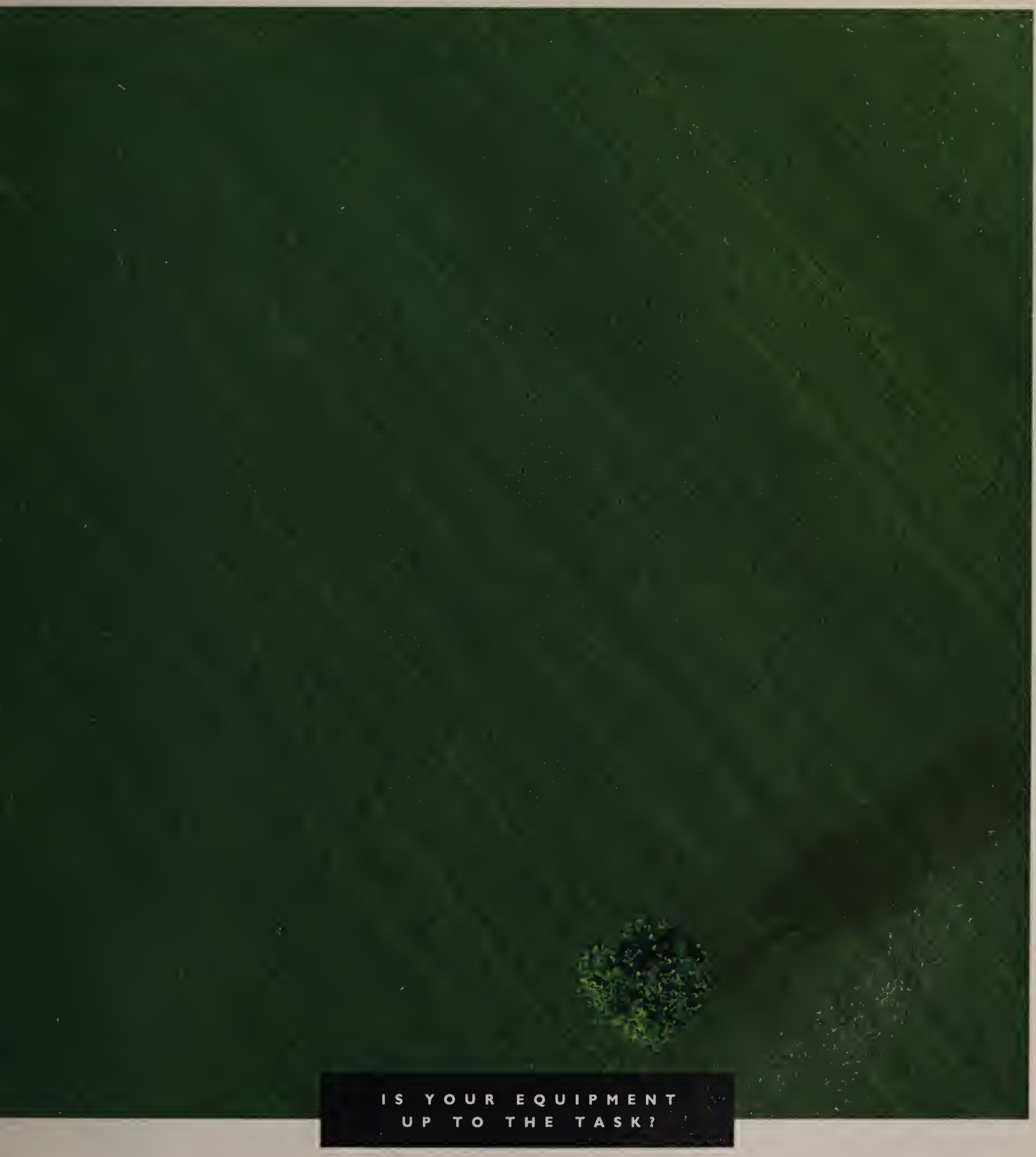
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Circle 139 on reader service card

Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

Artist: San Francisco–based John Lund has been a commercial photographer for 17 years. He began using Photoshop three years ago, and within six months was doing all his work digitally. He has been using Live Picture since he got his hands on a beta version last October.

How It Was Done: Lund created this conceptual image, which illustrates that time is money, for his growing stock-photo collection. He began by scanning in a photo of a dollar bill, which he converted to Live Picture's proprietary IVUE format and "inserted," or imported, into Live Picture.

After erasing parts of the dollar bill, Lund scanned the hourglass photo and inserted it as the second layer of the image, where he rotated it counterclockwise 10 degrees and created a stencil around it. Then he erased the image inside the hourglass, allowing the underlying image—the dollar bill—to show through the glass.

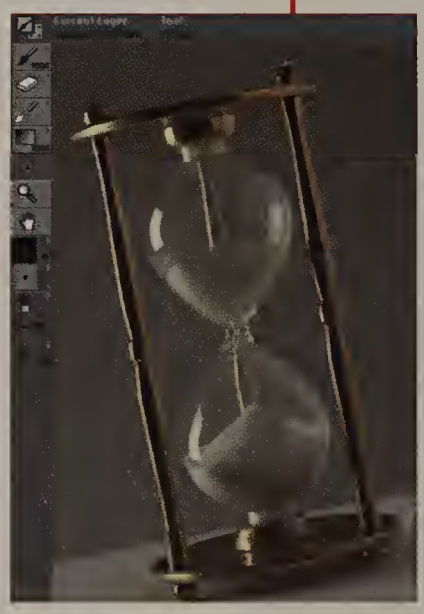
For the squeezed dollar bill inside the hourglass, Lund inserted another scanned photo as the third layer. After rotating it to align with the hourglass, he created a stencil around it and squeezed it into the shape he wanted. Then he rendered out the bottom portion of the distorted dollar, saved it in TIFF format, and imported it into Photoshop, where he applied a filter from Kai's Power Tools to give it a sandlike effect. Next he converted the image back to IVUE format and inserted it into Live Picture as layer four, then sized and positioned it.

The last layer of the illustration was Abraham Lincoln's profile taken from a scanned photo of a penny. After inserting it, Lund rotated, sized, and positioned it. He used a stencil to remove everything but the face to give the profile a hard edge, then with the eraser he added a soft edge to the back of Lincoln's profile.

Finally, using the Add/Edit command (View menu), Lund created the view of the image for final rendering by dragging a selection box around the area of the image he wanted to build. **m**



1 Using the eraser with a medium-size brush, Lund painted brushstrokes over the scanned dollar bill to erase parts of it; then he used the insert brush to put selected portions back in.



2 With the pen tool, Lund drew a path around the hourglass, from which he created a stencil. (In Live Picture, a stencil—which consists of a solid area and a hole cut into that area—is positioned on top of a mask: the solid part of the stencil hides the mask underneath it, while the hole lets the mask show through.)



3 After creating the stencil around the hourglass and activating (applying) it, Lund erased the solid interior of the hourglass to make the dollar image underneath visible.



4 The Create menu provides three ways to insert an image into Live Picture: Image Insertion, Image Distortion, and Image Silhouette; which one you choose depends on how you plan to manipulate the image. Here, Lund used Image Distortion to insert the dollar bill that he would later squeeze into the hourglass.

THE TOOLS

Hardware: Mac Quadra 950 with 140MB of RAM and a 1.6GB internal hard drive; Quantum 1.2GB external hard drive; SuperMac Thunder/24 accelerated graphics card; Relax Technologies 44MB SyQuest removable-cartridge drive; SuperMac SuperMatch 21 color monitor; Wacom 12-by-12-inch graphics tablet.

Software: Live Picture 1.5 B2; Adobe Photoshop 2.5.1; Kai's Power Tools 2.0.





8 To intensify the color on the dollar bill in the background, Lund manipulated the curves in Live Picture's Color Control dialog box. In the Preview window, you can move the image around to zero on any part of the image.



9 Once Lund finished manipulating the image, he drew a selection box around the area he wanted to render out for what's known in Live Picture as the final build. Displayed along the right side are the individual images—each on its own layer—that make up the illustration.



5 Using the pen tool to outline the scanned dollar bill, Lund made a stencil to eliminate the background area so that only the dollar bill itself would show.



6 Lund used the distort setting of the brush to push and squeeze the dollar bill until it appeared to be passing through the narrow middle of the hourglass.



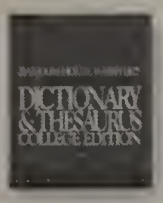
7 In Photoshop, Lund applied the Pixelstorm filter from Kai's Power Tools 2.0, which gave the dollar bill the appearance of turning into sand.



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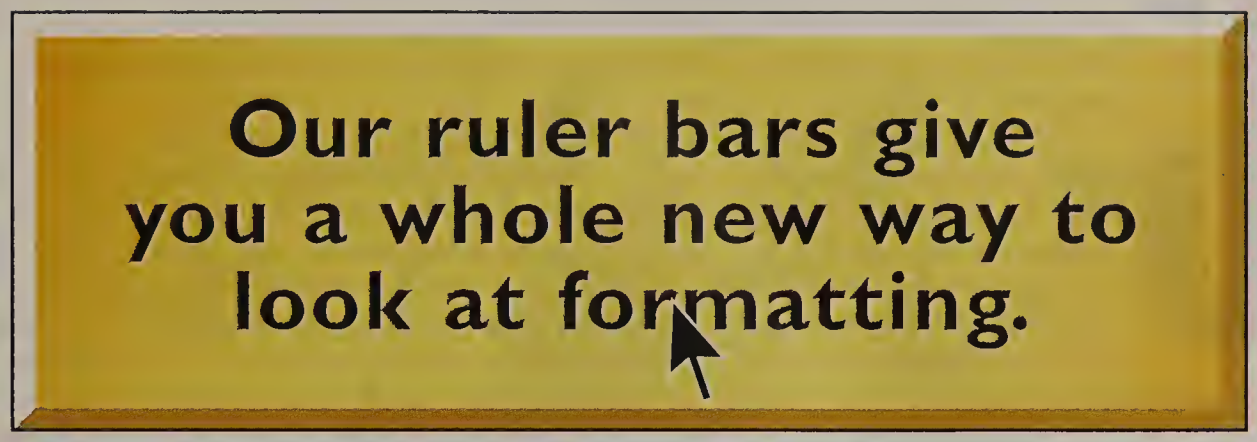
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Inside PostScript

Color printing is always a dicey proposition. With a lot of skill—and a little luck—you may get your final output to closely resemble your on-screen original.

If you use a dye-sublimation device for proofing, you already have a big advantage in reconciling the final output with the original artwork, because dye-sub devices can mix the cyan, magenta, yellow, and black (CMYK) inks to create millions of colors.

But creating a wide range of output colors is a far cry from matching a particular set of colors on screen. Adobe Systems gave publishers a boost when it released its long-awaited PostScript Level 2 drivers last year. Level 2, the second generation of Adobe's page-description language, added several features to reflect users' growing demand for color, a wider selection of fonts, and higher-resolution output. PostScript Level 2 drivers are bundled with printers that support Level 2, and they can be purchased directly from Adobe (Adobe PostScript Printer Driver 8.1.1, $24.95; 415/961-4400, 800/833-6687).

The latest revision of Level 2 cleans up a batch of code that had been muddied by the myriad extensions that were written to the original PostScript over the years. Color extensions, which gave PostScript the ability to describe and print colors, are now a part of the base language, as is Display PostScript, which uses the language to describe on screen the same graphics and fonts rendered on the printed page.

Level 2 also adds to PostScript's repertoire of printing capabilities. Printers that support Level 2 can fax PostScript documents, cache patterns and forms between multiple printings of the same document, and generate accurate screen angles for smoother halftone printing. Level 2 also compresses and decompresses documents.

Still a Little Off-Color

A big promise for Level 2 was *device-independent color*—a way to view documents on any monitor, print them on any printer, and have the colors appear the same (or as close as possible) from device to device. To achieve this level of consistency, a technology must take colors described in red, green, and blue (RGB) data, from a scanner or monitor, and match them to CMYK data, which printers use to describe colors. Color translation is a fundamental obstacle to achieving true device-independent color. Even with Level 2 drivers, color translation is still a stumbling block, and device-independent color remains a dream.

But don't just blame Adobe. Other pieces of the device-independent color puzzle must come from applications developers, monitor and printer manufacturers, and Apple. Apple's contribution is ColorSync, a system-level color-management scheme that will eventually encourage other parties to deliver device-independent color—provided they all write applications to support the scheme.

ColorSync is a system extension that allows your Mac to describe the colors for any device (monitor, scanner, or printer) in a common fashion. ColorSync 1.0, the current version, uses the RGB model in the Apple 13-inch Trinitron display to describe all RGB colors. This description is called a color profile. An application that supports ColorSync can call up the profiles of whatever devices are in use, match colors, say, between your monitor and your printer, then hand off the resulting file to the PostScript driver, which sends the file to the printer.

Unfortunately, there's a rub. The first Level 2 driver, version 8.0, did not support ColorSync. Version 8.1.1 recognizes ColorSync files, but because Level 2 and ColorSync do not use the same device profiles, they don't provide an exact match by themselves. Therefore, the output from your printer still won't match what you see on your monitor, because ColorSync and the Level 2 drivers are not completely compatible.

Calling a Shade a Shade

To make this marriage work, printer vendors need to provide *color-rendering dictionaries*—files that define a printer's colors and provide a wide range of values for each color.

Although these dictionaries help you get better color fidelity between monitors and printers, they don't guarantee it. While the Level 2 drivers support an unlimited number of color-rendering dictionaries, most Level 2 printers ship with only one general dictionary. This can cause problems if your needs are specialized—if, for example, you want to print presentation graphics on transparencies, while the dictionary in your printer is geared for plain paper.

Printer vendors can and will provide additional dictionaries, but clearly this won't close all the gaps in the color-matching process. For instance, not all monitor and scanner vendors have written ColorSync profiles for their devices. By the end of this year, however, one of the most important compatibility gaps—between the ColorSync profile and Level 2 driver—will most likely be bridged when Apple releases version 2.0 of ColorSync, which will describe colors the same way Level 2 does.

Meanwhile, by the time you read this,

Level 2 improves printer performance and promises color fidelity



Level 2

BY KRISTI COALE

JOHN HERSEY

Adobe should be close to shipping version 8.2 of its Level 2 driver, which will fully support ColorSync 1.0 and 2.X and should work to match the color profiles that ColorSync sends to the printer (see "Moving toward Device-Independent Color"). Just as Adobe Acrobat substitutes a similar font when the actual one isn't available, PostScript Level 2 will substitute a similar color profile when it doesn't find the required one in the output device.

Small Features, Big Results

One boost to color printing that does not depend on future versions of ColorSync or printer drivers is Level 2's halftoning algorithm. Through this scheme, PostScript is able to describe more lines per inch and smaller angles on screen and thus generate a higher-resolution image. The result is more color and image information, which allows for smoother color separations. PostScript Level 2's halftoning feature also enables you to create a low-resolution image for faster printing (as you may want to do when proofing).

The PostScript Level 2 drivers support a number of other printer-specific features. One way that they do this is through PPD (printer page description) files, portable ASCII files that tell the printer driver about a device's specific features. PPDs, which generally come from printer vendors, can tell the driver what type of paper is in which tray. For instance, if you need to print legal-size transparencies, or want to print on letterhead paper, the Print dialog box reflects that choice (see "Working Smart," *Macworld*, June 1994). Moreover, PPD files make it easier for printer vendors to offer new features that existing applications will readily support.

New Fax Standards

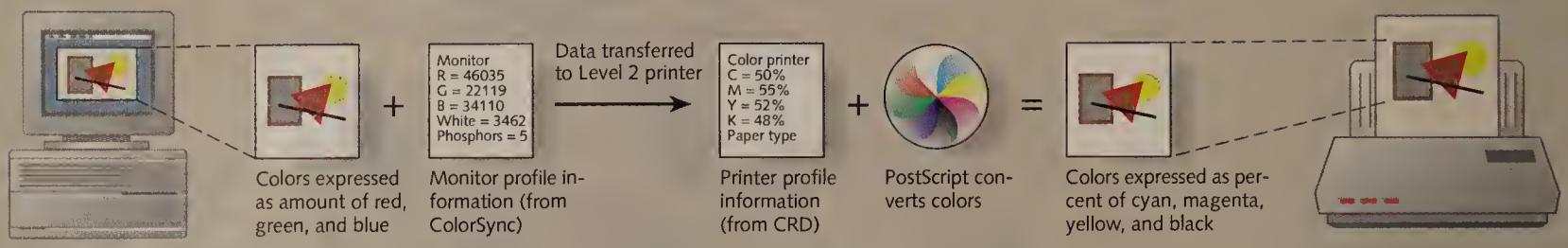
Level 2 also extends the benefits of PostScript printing to fax technology. The new drivers let printers that support PostScript Fax receive faxes as PostScript documents and send files to other PostScript Fax devices as well as to conventional fax machines. Output from a PostScript Fax printer is superior to that from an ordinary fax machine—documents are output on plain paper at the printer's highest resolution. And if the receiving printer supports large-format media, gray-scale, or duplex output, you can send PostScript Fax files that use those features.

PostScript Fax printers support the CCITT Group III fax protocol, a worldwide standard establishing the base resolution for a fax at 200 dpi by 100 dpi, and a fine mode at 200 dpi by 200 dpi. And PostScript Fax includes the Error Correction Mechanism, a special feature of the Group III protocol that allows a receiving fax machine or printer to request retransmission of data that is corrupted in the sending process. The net result is a higher-quality fax.

PostScript Fax technology brings advantages beyond higher resolution. Network managers can avoid the hassle of hooking up individual fax modems, since network printers with faxing capabilities can double as network fax machines. Because these devices are also printers, they treat incoming and outgoing faxes the same as other documents, so there's no extra configuration involved. If the device is in the middle of a print job when it receives a fax, it holds the incoming fax in the print queue.

PostScript Fax also has built-in LZW compression and decompression capability; a PostScript Fax device generates a file that's more compact than ordinary faxes, reducing the time and cost of transmis-

Moving toward Device-Independent Color



ColorSync, Apple's system-level color-management system, is a critical step toward ensuring better color fidelity between monitors and printers. ColorSync will work much better, however, when it combines forces effectively with PostScript Level 2's color-conversion prowess. Currently PostScript offers more-detailed device profiles—descriptions of a device's color capabilities. ColorSync 2.0, due out by the end of the year, should eliminate this discrepancy.

ColorSync is a repository for profiles of various color devices; it's also a system for managing colors and translating them between devices. PostScript Level 2 offers an alternate conversion engine. When combined, ColorSync and PostScript Level 2 offer various options for printing an on-screen image, each of which should yield reasonable color fidelity. One of these options creates device-independent color files.

In that case, ColorSync combines the RGB data from the screen image and a corresponding monitor profile. The profile contains three parts: the monitor's white point, data on the minimum and maximum strength of each phosphor, and information on how the RGB values can be described as values within CIE-XYZ—a color-designation system that represents a common language for describing the RGB values created by a monitor and the CMYK values created by a printer.

The printer driver or application hands off this combined file to the Level 2 printer, where PostScript converts the RGB colors into CMYK equivalents, using a printer-resident Color Rendering Dictionary (CRD)—a profile of the printer's capabilities. This method offers device independence because the transmitted file contains all the essential RGB and CIE-XYZ coordinates needed for transformation. Any Level 2 color printer can use that information to render a color image with reasonable fidelity.

sion. And by the time you read this, PostScript Fax should support color faxes.

No More Memory Drain

Perhaps the biggest improvement in PostScript is that Level 2 makes printing faster and more efficient. Under Level 1, each operation that a PostScript printer performed—such as rendering and caching fonts—had its own memory allotment, and the user didn't know how the printer allocated memory for each task. One pool of memory stored fonts downloaded to the printer; another served as a temporary storage area for a document while it was being built. Once the document was printed, the memory was free to build another document.

If one operation—building the page, for example—ran out of memory, your document might not print. Adding more memory to the printer wouldn't necessarily alleviate the problem, because you had no way of knowing whether the printer would allocate the extra memory to the function that required it. Level 2 remedies this situation by making all printer memory available to all printing tasks.

Level 2 adds another important efficiency factor—pattern and form caching. Earlier high-speed printers had to rebuild common elements, such as logos or even entire forms, for each page within large, repetitive jobs. This negated some of the benefit of having a high-speed printer. Level 2 does for forms and patterns what the original PostScript did for fonts commonly used in a series of print jobs—it renders and downloads them into a cache of printer memory, where they can be used for each successive job. They do not have to be rendered and downloaded each time they are needed.

Level 2 also speeds up printing with compression and decompression filters. It supports several industry standards for compression, decompression, and ASCII encoding of binary data. The Level 2 drivers can compress various components of a print job before sending them over a network to the printer, where the Level 2 interpreter then decompresses each file before printing it. By generating smaller, compressed files, Level 2 reduces network traffic and speeds up printing.

Faster Rasters

Adobe has also incorporated a revamped Adobe Type Manager (ATM) rasterizer in Level 2. ATM, a set of PostScript subroutines, generates scalable font outlines on the fly for display on screen and speeds up font rendering for non-PostScript output devices.

Moreover, version 8.1.1 of the driver finally supports TrueType font rendering—something that, till now, PostScript clone vendors could claim as an advantage over PostScript. Generally, PostScript clones such as Phoenix Technology's PhoenixPage have closed the gap in performance, while Adobe has narrowed the gap in price. Since the clones support most of the major Level 2 features, consider your needs for printer features and your price range first. Support for official Adobe PostScript should be secondary.

Buying a clone is not entirely risk-free, however. Clone vendors are sometimes slow to implement their versions of new PostScript features; most, for example, have yet to build in support for PostScript Fax. (QMS is the only clone vendor to claim that its software supports PostScript Fax, but the company does not offer a printer with faxing capability.)

Proof Is in the Printing

The continuing absence of device-independent color is frustrating. But while Adobe and other parties keep working on this elusive goal, professional publishers can rely on relatively effective (if complex and costly) color-matching systems such as Cachet ($299; Electronics For Imaging, 415/286-8600, 800/285-4565).

Still, PostScript Level 2 is an impressive update. The latest drivers offer faster performance and better control over many aspects of printing. Plus, these drivers help unify two similar functions—printing and faxing—under one interface, with one device. This is no small feat. In the coming months, look for a rush of new printers with Level 2 support as well as the features we've been craving for years. **m**

Freelance writer KRISTI COALE has covered Macintosh desktop publishing and design for the past six years.

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EDITED BY DAN LITTMAN

At Work

THE LATEST TOOLS FOR BUSINESS COMPUTING

PowerPoint Dresses for the Office

MICROSOFT IS MODIFYING POWERPoint's interface to make the program look and work more like its Microsoft Office–mates, Word and Excel. For example, PowerPoint version 4.0 will have customizable tool bars and a status bar across the bottom of the window. The presentation package will also have what Microsoft calls Wizards, helpers (first seen in Excel) that walk you through such tasks as choosing an effective template or formulating ideas into bite-size bullet points.

Besides Wizards, PowerPoint 4 has other features that take the guesswork out of creating presentations; these include transition-effect previews in the slide-sorter view and a rehearsal mode that records how long you spend on each slide as you practice your speech before an audience of pencil holders, tape dispensers, and coffee mugs.

PowerPoint relies on OLE to connect to a separate, hot-linked graphing module, and to create tables using Word's table editor. A button can also send the content of a PowerPoint file into Word or import a Word document.

PowerPoint 4.0 will include about 1100 pieces of clip art with a keyword index, and the program has a wide range of drawing tools for modifying clip art or creating new art. PowerPoint 4.0 will list for $495 and be included in the $695 Office. Microsoft, 206/882-8080, 800/426-9400.—D.L.



JOSEPH POPA

ActiGraf Models Business

TO RESTRUCTURE YOUR BUSINESS and make it operate more efficiently you must understand how it works now. That requires modeling your business—its manufacturing, decision-making, paper-tracking, transportation, and other processes—to find the efficient steps, the bottlenecks, and how they affect each other. A whole class of software has emerged to help managers grasp the big picture by linking iconic representations of steps in a process, such as waiting for something else to happen, acting in a certain way based on a decision, and so on.

A new company called Business Modeling Systems is entering the market with ActiGraf. ActiGraf is based on IDEF, a modeling technique developed by the Air Force to analyze manufacturing. ActiGraf uses an iconic version of Petri nets, which represent sequential and parallel steps and decision points where processes diverge. You can designate that steps take a certain amount of time; send their results to another step; and embed basic calculations. After you connect all the icons, you can run the model as a simulation to see an animated representation of what happens.

ActiGraf is $795; its ship date was not set at press time. Business Modeling Systems, 415/941-3901.—D.L.

Claris Enters PIM Market

NOBODY KNOWS JUST WHAT A PIM—personal-information manager—is, but software vendors agree that we all need one. That's why Claris, which sticks to products with broad horizontal appeal,



Claris's new personal-information manager, Claris Organizer, showing the calendar in month view and the contact manager.

is launching a PIM under the low-price Claris Clear Choice label.

Claris Organizer (CO) follows in the footsteps of products like Common Knowledge's Arrange and Rae Technology's Rae Assist with an ability to understand information as you enter or manipulate it and to automatically build relationships between different pieces of information. For example, if you drag Joe Smith's name and phone number from the address book to the to-do list (yes, data can be dragged between windows), CO creates a new to-do item labeled "Call Joe Smith."

CO provides all the standard PIM capabilities: printing labels and standard pocket-notebook formats, searching for items using highly specific criteria, and interrupting other applications with its reminders, among others. Creating new contacts, to-dos, and notes can be partially automated with templates that can include priority level, category, boilerplate text, and other information.

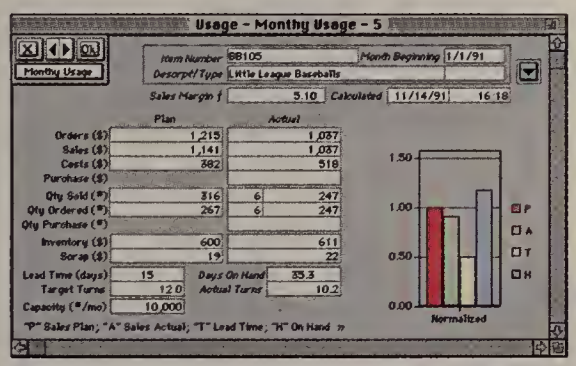
With CO, Claris has solved some problems that beset competing products. Banners—colored bars that indicate events lasting several days—appear in an area above the calendar itself to avoid obscuring information. You can change the field name for some fields across all records, and for other fields, on individual records.

CO should list for $75 to $100 and should ship in July. Claris Clear Choice, 408/727-8227, 800/325-2747.—D.L.

Automating Sales and Operations

NO SALESMAN IS AN ISLAND. IN FACT, a salesperson's work is just part of a series of steps that begins when a prospect is identified and continues long after the prospect becomes a customer. With the complete sales cycle in mind, James Technologies developed theCustomer to roll sales-automation support into an operations-oriented database for managing inventory and receiving, invoicing and receivables, and other tasks.

James Tech has been marketing the 4th Dimension–based program in custom versions for several years, but 3.0 is the first version of theCustomer to be generally available. All transaction information can be associated with general-ledger account codes for export to an accounting system. theCustomer includes SuperReport, an embedded 4D extension for generating reports. The program lists for $649 for one user, including a runtime version of 4D; pricing is less per user for quantity buys. James Technologies, 612/484-9549, 800/735-0635.—D.L.



One of theCustomer's reports, showing plan-to-actual for sales of an item in inventory.

IN BRIEF

■ **Time-Billing for Newton** The Newton continues to attract new developers of practical business-oriented software. TimeReporter, from iambic software, is designed for attorneys, consultants, and others to record the time spent with clients and then generate billing statements. TimeReporter can import and export information including contact and calendar information, as well as accounting information. iambic, 408/746-3709. (For more on time-billing, see this month's *Working Smart*.)

■ **SQL, New Analyses for MapInfo** MapInfo 3.0 for the Mac will include MapInfo Corporation's SQL DataLink for access to Sybase and Oracle databases. Version 3.0 also has improved features for creating and balancing regions such as sales districts. In addition, the new version has improved thematic maps and can display a raster image, such as an aerial photo, underneath a vector map. Version 3.0 should ship in the fall for $1295. MapInfo, 518/285-6000.

WordPerfect's Paperless Future

WHEN WORDPERFECT RECENTLY announced plans to wrap its future around networking giant Novell, WordPerfect—so well known for word processing software that creates electronic documents—also announced a future in documents that are distributed and read electronically.

Like the competing Adobe Acrobat, Farallon's Replica, and No Hands' Common Ground, WordPerfect's Envoy consists of a print-to-disk utility and a viewer. The viewer can be embedded in documents so that the recipient can open them without owning Envoy. The viewer also provides mark-up tools for commenting on documents; Envoy owners can later import comments into the original file. Envoy can embed TrueType fonts or try to match font metrics to fonts installed on the recipient's system. For navigating inside Envoy documents, the person creating the document can include hypertext links and bookmarks, and the viewer provides text-search capability and thumbnail views.



Envoy is not the product's final name. It should ship in mid-1994 for $189, with no license charge to embed the viewer. WordPerfect, 801/225-5000.—D.L.

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Circle 41 on reader service card



BY JIM HEID

Working Smart

Time-Billing Software

TIME IS NOT MONEY—NOT IF YOU DON'T keep track of it. Many professionals, from attorneys and architects to consultants and freelancers, bill by the hour. But too many of these folks rely on time-billing systems that are, shall we say, informal: notebooks with entries scrawled in the margins, slips of paper tossed in an envelope, guesstimates jotted down during the bus ride home. And every time these casual timekeepers forget to log a phone call or record a consultation, they lose money.

If you're in this group, you should know about software that helps you track—and charge for—your time. Time-billing software keeps a database of the work you do and provides accounting features for generating invoices and performing other functions. Some time-billing programs can link directly to an accounting system's receivables file; some even offer project-management and project-analysis capabilities that let you create charts and reports showing how you've allocated personnel to projects.

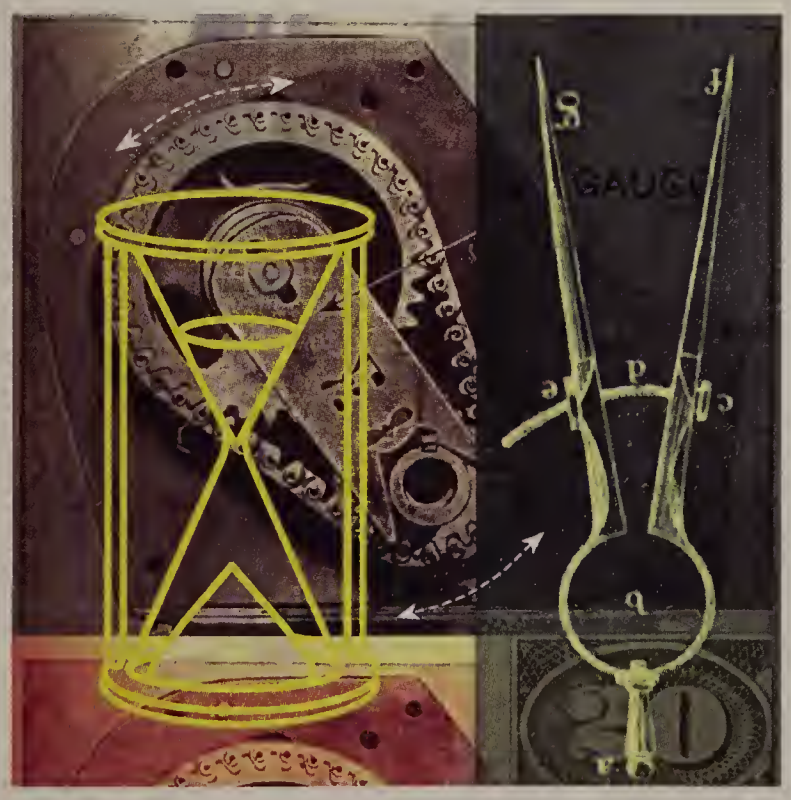
How Time Billing Works

At the core of a time-billing package is a database manager that stores each variable in the time-billing equation: the names of your clients, the services your company provides for them, the personnel who perform the work, and the rates you charge for each service.

To set up a time-billing program, you generally begin listing the kinds of services you render, along with the hourly rate you charge. All time-billing programs let you specify details, such as whether the activity is taxable, billable, or nonbillable, and they all provide a category for keeping track of such expenses as couriers and mileage. With some programs, including Timeslips Corporation's Timeslips III and LapTrack, you can specify a markup or discount on labor and expenses.

Another phase of the setup process involves pecking in the names and addresses of existing clients. If you've already entered this information elsewhere—for example, in a database or a contact-management program—there's a good chance you can import it into the time-billing package instead of retyping everything. Most programs can import tab- or comma-delimited text files (for details on importing and exporting database information, see *Working Smart*, December 1993).

You don't have to set up everything in a rigid order. All time-billing programs allow you to enter new clients and define new activities at any time. But it's a good idea to define a set of activities at the outset to ensure that you're naming them consistently. This is especially important if several employees will be sharing a time-billing database on a network.



You also need to specify how your company charges for work. In most companies, rates vary depending on three criteria: the employee (consulting with a senior partner might command a higher rate than working with a junior partner), the task (an architect might charge more for design work than for drafting), and the client (a big customer might get a discount). Overall, Timeslips III, Satori's Project Billing, and DesignSoft Time & Billing do a better job accommodating this three-dimensional billing grid than the competition. Brainchild's Shortlist doesn't even let you specify a different rate for each employee—not surprising, given this program's personal-information-manager orientation.

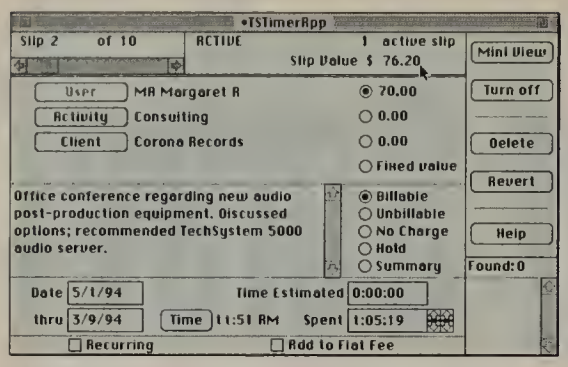
Timing Is Everything

The real fun begins after you've survived the initial setup and started tracking your time. You can manually enter data in batches—at lunchtime, at the end of the day, or whenever you get a moment. But unless you have an elephant's memory, the batch-entry method requires you to write everything down until your data entry session—and that's not much better than the notebook or shoebox method you're trying to replace.

If you work with a computer at hand, you can use the built-in timers that Timeslips III, LapTrack, Satori's Job Cost/Time Billing, and Project Billing provide. These timers work with the Mac's built-in clock to calculate the amount of time you spend at a task. You just notify the program when you start and stop.

In keeping with manual time-billing traditions, most programs call their time-tracking windows time slips. Generally, you create a time slip by selecting a client, specifying the activity to be performed (and, in an office, who's performing it), and noting whether or not it's a billable activity (see "Making a Time Slip"). You then enter the time data manually or activate the program's timer. All time-billing programs allow you to annotate time slips

continues



Making a Time Slip In Timeslips III you record activities in the time-slip window. Note the charge being run up (next to the Slip Value field name). Clicking on the Mini View button shrinks the window to show the client, time, and current charges.

with comments that you can optionally include in invoices or reports.

If clients can see your screen as you work, you might not want to use a timer feature. Such timers display a running tally of how much a given activity is costing, and clients might not enjoy watching the charges mount as they sit at your desk. Only taxi drivers can get away with that sort of thing.

Reporting Results

Like database managers, time-billing programs provide features for locating time slips by various search criteria—who performed the work, the type of work performed, the client, and so on. You might use a search feature to determine who worked on a particular project on a given day, perhaps to follow up on a customer's question or complaint. Or you might use it to determine how much nonbillable work was performed on a given job—perhaps to monitor an employee's performance or to locate weak links in your company's processes. Part of what makes a time-billing package valuable is how well its reports let you examine and analyze the information you've gathered.

Most often, the reports you create are invoices that summarize the work performed for clients and show the amounts due. If you already use accounting software, you can export the data to your accounts receivable module. Better still, Timeslips III users can turn to TAL (Timeslips Accounting Link), which ties Timeslips III into many popular accounting packages. Satori's Job Cost/Time Billing meshes with Satori's other Components products of accounting modules.

What other types of reports might you create? That depends on what you want to know. With employee-oriented reports, you see who is doing what for which clients—good for monitoring employee performance and for determining who is available to take on a new project. You can apply multiple sorting levels when creating the report to look at each employee's activities from different angles: time spent on specific tasks, on specific projects, and so on.

Client-oriented reports tally up the year-to-date or monthly billings for specific clients, show past-due amounts, and list activities performed for a client. Work-in-progress reports give you the up-to-the-minute status of accounts to help you make informed billing decisions.

Of the programs I looked at, Satori's Job Cost/Time Billing has the best report-design features (for $1495, it had better). The package provides on-screen rulers and other layout tools for designing reports, as well as straightforward dialog boxes for specifying their contents. Reports can even contain charts of, say, billings by employee by month. The program comes with more than 25 canned report designs that appear in a menu for quick recall. The reporting features in Satori's Legal Billing II and Project Billing are less comprehensive; overall, they lack the depth of Timeslips III and Job Cost/Time Billing. But both are good basic programs that need only about 300K of memory to run (Job Cost/Time Billing, by comparison, needs 1.4MB)—something to keep in mind if you're using a PowerBook or an entry-level Mac.

Timeslips III also has strong reporting features, although its layout tools aren't as polished. LapTrack's reporting features are less complete, but they're adequate for a program intended to be used on the road. LapTrack provides other features useful to road warriors, such as a telephone-dialing command that dials customers using the PowerBook's internal modem. LapTrack can even begin logging time automatically when the dialing is complete.

Watching Your Windows

I've mentioned that time-billing packages let you make entries manually and also provide a stopwatchlike timer you can start and stop. But if the work for which you charge takes place on the Mac itself—for example, doing online research with a telecom program, or designing pages in a desktop publishing program—there are even easier ways to track your time. Coral Research's TimeLog and ASD Software's WindoWatch can watch over your shoulder and automatically record the amount of time you spend in various applications and documents. Both packages include

continues

MORE TIME-TRACKING BENEFITS

Ease of tracking and charging for your time is reason enough to consider a time-billing package. But there are other benefits.

- By isolating billable and nonbillable time, you can find weak links in your business's organization. For example, if you're a graphic artist and often spend a nonbillable hour to drive across town to use a service bureau's color printer, tallying up all those nonbillable hours might show that it makes more sense to buy your own printer.
- If you charge by the job instead of by the hour, you can still use a time-billing program to find out how much you're making on each aspect of a job. By comparing reality against your estimated charges and costs, you can adjust future estimates.
- If you're a department manager, a time-billing package can help you determine staffing requirements, by keeping track of how many jobs and how much work goes through your department. Large institutions can also use time-billing software for interdepartmental billing—for example, an in-house publishing department might track the time it spends on projects for the marketing, training, and personnel departments.

These examples show that a time-billing program can help you gauge your business's efficiency. But don't let yourself become a slave to such software. Anyone who has worked in a service business that charges by the hour knows that time slips can be fudged and finessed to cover up, say, an extra-long lunch break or an error that required work to be redone. Basing major staffing decisions solely on time-billing data ignores the way people actually work.

What's more, employees may find it demoralizing to know that their activities are being monitored minute by minute. Nonetheless, it's happening more and more in fields that rely on computers. For example, calls taken by directory-assistance operators are timed, and operators who don't meet their quotas can expect to hear from their supervisors. I'd hate to see this kind of digital dogging make its way into the personal-computer world. Time may be money, but employees are people.

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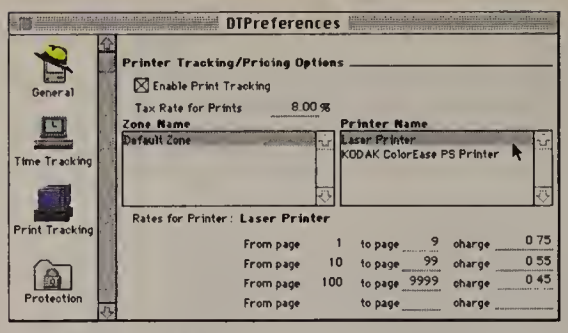
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Circle 190 on reader service card



Paying for Pages KansasBay Systems' DeskTracy lets you track and bill for the use of your printers. This screen shows a pricing structure for laser-printer output with quantity price breaks.

control panels that do the monitoring, as well as programs that let you create reports on window usage and configure the control panel to omit certain windows from the logging process. (After all, do you really need to know how much time you spend in the Finder?)

Coral Research also offers SlipMinder, a window-monitoring utility that uses Apple events to transfer window-use information into Timeslips III and LapTrack. This utility eliminates the need to manually invoke these programs' timers when tracking your time on the Mac.

The Apple events support in Timeslips III and LapTrack means you can create your own links to these programs with any application or utility program that also supports Apple events. For example, you might use CE Software's QuicKeys to create a keyboard shortcut that automatically begins or ends a timing session. If you're a consultant creating customized FileMaker Pro or Microsoft Excel templates, you might use Apple events to automatically retrieve a client's time-slip data when you type the client name into a field or cell.

Finally, if you're a QuarkXPress user and want to track only how long you work in that application, consider Trias Development's Time Logger, a Quark XTension that records the time spent working on an XPress document. It's available through the XTensions clearinghouse XChange (303/225-2484, 800/788-7557).

WHERE TO BUY

Components Job Cost/Time Billing 1 $1495; **Project Billing 1.6** $195; **Legal Billing II 2.6** $295; Satori Software; 206/443-0765.

DeskTracy 2.3 one user $149, five users $495, ten users $695; **DeskWatch 1.0** (price not set at press time); KansasBay Systems; 510/268-8100.

DesignSoft Time & Billing 1.87 $149.95; DesignSoft; 708/858-5363, 800/426-0265.

Shortlist 1.0.1 $99; Brainchild; 513/831-8451.

TimeLog 2.0 $149; **SlipMinder 1.0** (less than $100—price not set at press time); Coral Research; 702/831-9346.

Time Logger 1.2 $49; Trias Development; available through XChange; 303/225-2484, 800/788-7557.

Timeslips for the Mac 2.1k one user $299.95; network edition, five users $699.95; **LapTrack for the Mac 1.0g** $79.95; **Timeslips Accounting Link 1.1** $79.95; Timeslips Corporation; 508/768-6100, 800/285-0999.

WindoWatch 1.55 one user $149, five users $449, ten users $749; ASD Software; 909/624-2594.

Watch Your Printer, Too

Window-watching utilities are also potentially useful for service bureaus, college computer centers, copy shops—any organization that rents Mac time by the hour. But such groups also need to keep track of who's printing what on which printer so they can charge for the output. KansasBay Systems' DeskTracy tracks network printer use and tallies up charges. You can even specify different per-page rates for different printers—for example, a low rate for black-and-white printing and a higher rate for color output—and establish discount rates for multipage jobs (see "Paying for Pages"). DeskTracy can also track Mac time, although it tracks only the total amount of time someone spends at a given machine—not the time spent in various applications or documents. The utility also provides security features that can lock folders to prevent anyone from copying, changing, or trashing their contents. DeskTracy is a must-have for any organization that needs to control and charge for access to its printers but can't afford to hire a security guard to watch over them.

KansasBay Systems is also working on DeskWatch, a time-billing application that will combine window-watching features with manual time logging. The program should be available by the time you read this. **m**

Contributing editor JIM HEID has been writing about the Mac since its introduction. His latest books are *Macworld Complete Mac Handbook Plus CD* (1993) and *Macworld Word 6 Companion* (1994), both published by IDG Books Worldwide.



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Unless you speak in public on a regular basis or you're a natural extrovert, the prospect of standing before an audience for half an hour can be daunting at best and sheer terror at worst. Your Mac can't help you sleep soundly the night before you go on stage, but with good presentation software it can help you prepare for your talk. Whether you're selling an idea to 5 midlevel managers at your company or addressing 500 colleagues in a convention hall, presentation software allows you to organize your thoughts and gives your audience something to look at besides your sweaty brow.

I tested four traditional presentation programs—CA-Cricket Presents III 1.0, Symantec's More 3.1, Microsoft PowerPoint 3.0, and Aldus's Persuasion 3.0—to see how they handle organizing slides, text, and graphics; creating charts; and giving on-screen presentations. I also looked at three programs designed for various kinds of graphics work but that include some presentation capabilities: chart animator Astound 1.01 from Gold Disk, graph master DeltaGraph Pro 3.0.3 from DeltaPoint; and the new integrated-graphics entry ClarisImpact 1.0 (see "When Presenting Is Only Part of the Picture").

How Presentation Software Helps

So few people make a career out of presenting, and so many of us are required to do it occasionally, that presentation programs must appeal primarily to an audience of casual users. If you're a casual user yourself, a brief explanation of what a presentation program can do for you is in order.

You typically begin by organizing your speech into an outline, which the program automatically converts into slides, apportioning one slide to each major outline topic and creating subtitles and bulleted lists from subtopics. The program can format text and add graphic embellishments based on templates that come with the package or that you create. If your presentation involves numerical information, you can create graphs. When you finish designing your presentation, you can produce overhead transparencies or 35mm slides, or show the presentation directly from a computer using a large-screen projection device. You may also want to print handouts for your audience.

The four traditional presentation programs—Presents III, More, PowerPoint, and Persuasion—offer basic functions to meet the above demands, but they vary dramatically in ease of use and flexibility.

Ease of Use Because few of us use these programs regularly, we need some help slogging through the interface. Currently Persuasion is the easiest to use—it brings a new element of hand-holding to creating presentations. After you launch Persuasion and create a new document, the program automatically fashions a slide, complete with a dummy title, subtitle, and bulleted list, based on the default template design. As you click on the dummy text, Persuasion highlights it so you can immediately replace it.



But while Persuasion now leads the pack in ease of use, PowerPoint may best it before the year is out. Already available for Windows and scheduled to ship this summer for the Mac, PowerPoint 4.0 will include Excel-type "Wizards" to help you structure your speech and select and customize templates.

Flexibility No one creates a presentation right the first time, so you need to be able to conveniently reorganize, reword, and redesign your slides. All four programs provide a master layer for creating and positioning repeating background elements such as logos and conference titles. All but More provide a thumbnail slide-sorter view for quickly changing the order of slides, and all but Presents III allow you to adjust titles, subtitles, and bulleted items in your slides as easily as editing text in the outline view.

Presentation programs make it easy to change backgrounds, reformat text, and adjust the location of charts and other graphics by simply applying a new template. This gives you the option of experimenting with layouts and designs without committing yourself. You can also experiment with color schemes that affect all aspects of your presentation. One minute the background is black, the text is yellow, and the chart is green; apply a new color scheme and the background becomes navy, the text white, and the chart red. The colors in each scheme are designed to work in harmony, a real bonus if you're in a hurry to slap together something attractive.

CA-Cricket Presents III 1.0

Despite a recent face-lift, Presents III lags considerably behind the competition. It lacks an integrated outliner: you create your outline using a separate utility, Portfolio Systems' Dyno Notepad (which comes with Presents), and then import the outline, but you can't edit and dynamically apply the changes to your slides. Templates are similarly crippled. You can apply a template to format an outline as you import the outline into Presents, but you can't use a template to reformat text and reposition charts in an existing presentation.

by Deke McClelland

At $129, Presents III lists for much less than More ($395), Persuasion ($495), or PowerPoint ($395). But inexpensive doesn't mean easy. Presents III greets you with a blank, ten-page document when you start the program, a distinctly unfriendly sight for the uninitiated, and the program is rife with strange limitations—for example, you can't create tables when working in a reduced view, you can't cut and paste values inside the

Quick Show of Hands: How Presentation Packages Compare

	TRADITIONAL PRESENTATION PROGRAMS			SPECIALIZED SOFTWARE WITH PRESENTATION FEATURE			
	CA-Cricket Presents III 1.0	Microsoft PowerPoint 3.0	More 3.1	Persuasion 3.0	Astound 1.01	ClarisImpact 1.0	DeltaGraph Pro 3.0.3
General							
Company	Computer Associates International	Microsoft Corporation	Symantec Corporation	Aldus Corporation	Gold Disk	Claris Corporation	DeltaPoint
Phone	516/342-5224	206/882-8080	408/253-9600	206/622-5500	408/982-0200	408/727-8227	408/648-4000
Toll-free phone	800/225-5224	800/426-9400	800/441-7234	○	800/982-9888	800/544-8554	800/446-6955
List price	$129	$395	$395	$495	$399	$399	$195
Slide Construction							
Integrated outliner	○	●	●	●	●	○	●
Slide sorter	●	●	○	●	●	●	●
Automatic templates with placeholders	○	●	●	●	●	●	●
Multiple layouts per template	○	○	○	●	●	○	●
Global color-scheme control	●	●	○	●	○	○	●
Multiple color schemes per slide	○	○	○	●	○	○	○
Publish and subscribe	●	●	○	●	●	●	●
Import file formats	AIFF, ASCII, EPS, MacPaint, PICT, QuickTime, Scrapbook, SND, SYLK	ASCII, EPS, MacPaint, PICT, QuickTime, TeachText, TIFF, WKS, Word	ASCII, EPS, MacPaint, MacWrite, PICT, TeachText, Word, WordPerfect, WriteNow	Acta, AIFF, ASCII, EPS, Excel, More 1.1, Photo CD, PICT, QuickTime, Scrapbook, SND	1-2-3, Animation Works, ASCII, 8MP, EPS, Excel, GIF, PCX, Photo CD, PICS, PICT, QuickTime, SND, TIFF	ASCII, CGM, DIF, EPS, Excel, GIF, MacDraw, MacPaint, MacWrite, PICT, QuickTime, RTF, SYLK, TIFF, Word	ASCII, EPS, Excel, JPEG, PICT, QuickTime, SND, SYLK, TIFF, Trapeze, WKS
Export file formats	PICT, QuickTime, Scrapbook	RTF, Scrapbook	same as import formats	Acta, ASCII, More, PICT, Scrapbook	PICT, QuickTime	CGM, EPS, MacDraw, PICT	ASCII, EPS, Illustra PICT, Scrapbook
Text and Graphics							
Manual kerning	●	○	○	○	●	○	○
Style sheets	○	○	●	●	○	●	○
Search and replace	○	●	●	●	●	●	○
Editable drop shadow	○	○	●	●	●	○	●
Table editor	●	○	●[1]	●[2]	●	●	●
Equation formatter	○	●[2]	○	○	○	○	○
Number of drawing tools	10	29	6	8	20	27	11
Arrowhead editor	○	○	○	●	●	●	●
Graphic rulers/graphic guides	●/●	○/●	●/○	●/●	●/○	●/○	●/○
Radial gradations/shape gradations	●/○	○/●	●/●	●/●	●/●	●/●	●/●
Charting Capabilities							
Provides formulas	○	○	○	●	○	●	●[3]
Org charts/flowcharts	○/○	○/○	●/○	●/○	○/○	●/●	●/○
Time lines/calendars	○/○	○/○	○/○	○/○	○/○	●/●	●/○
Pictographs	○	○	○	●	●	●	●
Hi-low-open-close charts	○	○	○	●	●	●	●
Histograms	○	○	○	●	○	○	●
Polar charts/radar charts	○/○	○/○	○/○	●/●	○/○	○/○	●/●
Contour map/3-D surface map	○/○	○/○	○/○	●/●	○/○	○/○	●/●
Perspective spatial controls	○	●	○	●	○	○	●
Fill chart elements with gradations	○	○	●[4]	●	○	●	●
Chart animation	○	○	○	●	●	○	○
On-Screen Presentations							
Mac/Windows run-time utilities	●/○	●/○	○/○	●/●	●/●[5]	○/○	○/○
Number of transition effects	42	45	23	15	60	2	33
Automated build function	○	●	●	●	●	●	○
Animation effects	○	●[6]	○	●	●	○	○
QuickTime movies/sounds	●/●	●/○	○/○	●/●	●/●	●/○	●/●
On-screen slide annotation	○	●	○	●	●	○	○

● = yes; ○ = no. [1] *Separate application.* [2] *Linked OLE utility.* [3] *Select from dialog box.* [4] *Not all elements.* [5] *Saves as self-running application.* [6] *Flying bullets only.*

charting table, and you can apply gradations only to entire slides or backgrounds.

Presents III's main advantage over its predecessor, Presents 2.1, is the ability to import and play QuickTime movies and sound. These functions are of no use unless you're a multimedia enthusiast creating on-screen presentations, in which case you will gravitate toward more full-featured programs such as Persuasion and Astound.

More 3.1

Despite having gone for years without a significant upgrade, More 3.1 manages to keep up better than Presents III. More includes an integrated outliner—no surprise since outlining was originally More's primary function—and you can automatically reformat and reposition text and charts by switching templates (for more on More's strengths as an outliner, see "Smart Thinking," *Macworld*, May 1994). When playing presentations on screen, More lets you create automated builds with each bulleted item appearing in sequence and with the transition effects of your choosing. You can also run More presentations on two screens—one for your audience that shows only the slides, and one for yourself that includes your speaker's notes.

Where More shows its age is in the charting department. More Graph is a separate utility with no live links to More, so editing charts is inconvenient. And More Graph can produce only the most rudimentary charts, including bars, lines, and pies.

More lacks other useful functions as well, such as a slide sorter and global color-scheme control. And while More is in need of an update, it is unlikely to get one. At press time, Symantec had no plans to release a PowerPC-native version of More or upgrade the current 680X0 version. So, while More is adequate in many respects, and certainly more capable than Presents III, there's no sense in investing in a program that lacks even a potential upgrade path.

Microsoft PowerPoint 3.0

PowerPoint 3.0 provides everything you expect from presentation software, including a built-in outliner (see "Organizing Your Thoughts"), automated templates, and a color-scheme function. PowerPoint goes a step further by walking intrepid users through the daunting process of designing custom color schemes. After you select a background color, PowerPoint suggests several complementary text colors (see "Coordinated Colors"). Based on the text color you select, the program suggests several palettes that go well with both background and text. With faith in Microsoft's designers, you can't go wrong.

Like More's, PowerPoint's graphing capabilities are sectioned off into a separate utility, but they are linked via Object Linking and Embedding (OLE). This allows you to edit charts and dynamically update them in the slides. Furthermore, if you use Microsoft Word or Excel, you can establish hot links to text or data from these programs. It's one happy OLE family.

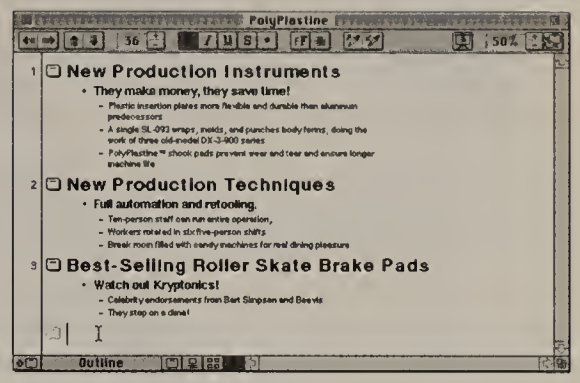
For displaying finished presentations on screen, PowerPoint takes the best from Presents III and More and throws in a few tricks of its own. Like Presents, PowerPoint plays QuickTime movies. Like More, PowerPoint lets you create automated builds. But PowerPoint goes More a couple better, letting you specify the duration of transition effects and animate bullets by having them fly onto the screen. And if you like to doodle while you talk, you can annotate slides by actually drawing on them with the on-screen equivalent of a yellow highlighter.

Persuasion 3.0

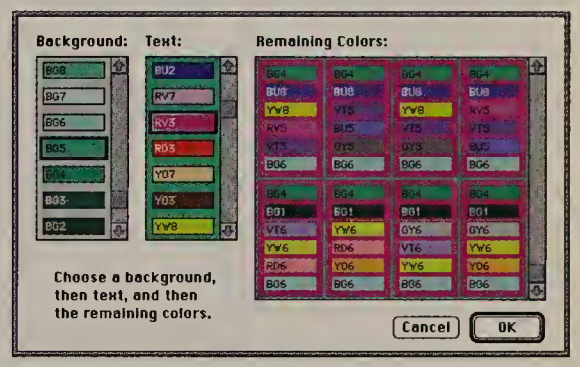
Persuasion matches PowerPoint's current capabilities and goes a few steps further. Instead of applying one color scheme to a slide at a time, you can maintain several color schemes—for example, one for color display, a second for gray scale, and a third for black-and-white output. Better still, you can apply different fill patterns to every element on every slide in each mode, fine-tuning your handouts without sacrificing the vibrancy of your slides or on-screen effects.

Persuasion 3.0's charting capabilities have been completely revamped. Persuasion now includes a separate OLE-linked graphing utility that completely eclipses the competition. Most helpful is the preview system, which demonstrates what the chart will look like after you modify it with commands and options. The data sheet's support for formulas means you can perform calculations without resorting to a separate dialog box or calculator. And of any program in this article, Persuasion provides the best controls for editing charts. The spatial controls for editing 3-D charts are especially satisfying, enabling you to rotate, zoom, pan, and change perspective with immediate feedback (see "Swiveling Charts").

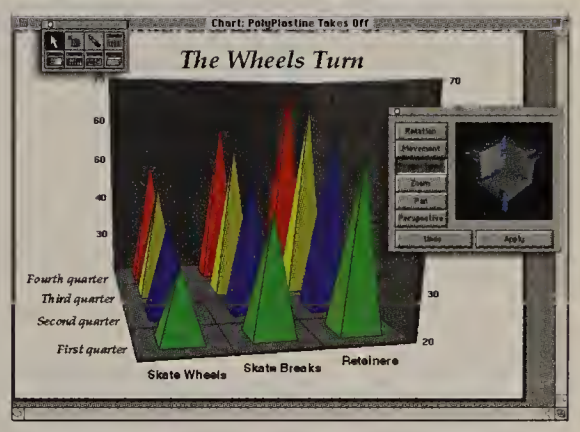
Persuasion offers the best on-screen options of any program except Astound. You can assign objects to different layers, which gives you great control over builds and other sequences as well as transitions and simple animation effects. This means you can fade text and graphics on screen in any order. Persuasion improves on PowerPoint's slide annotation by letting



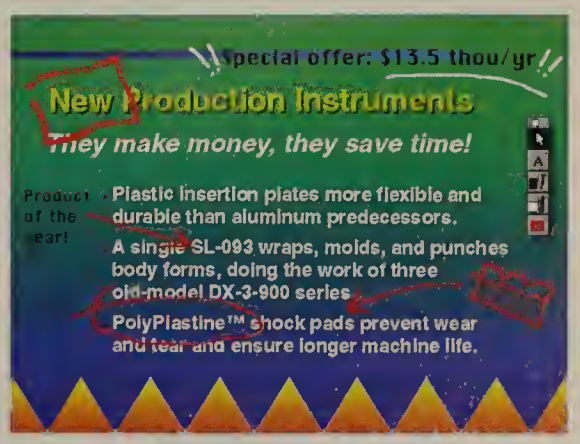
Organizing Your Thoughts PowerPoint's outliner lets you sketch out the main points in your presentation and fill in the details. Every major headline translates to a new slide; lesser headlines become bulleted items. You can even promote and demote headlines and move entries between slides simply by dragging items to different locations.



Coordinated Colors PowerPoint makes selecting attractive color schemes almost automatic. When you select a background color from the 90 available (left), PowerPoint makes only appropriate complementary colors available for text (middle), and then limits choices for other colors to appropriate palettes.



Swiveling Charts Persuasion's charting module lets you create spectacular three-dimensional charts that you can rotate, zoom, and pan dynamically from a floating palette. You can also format text on the fly and move chart elements around by dragging.

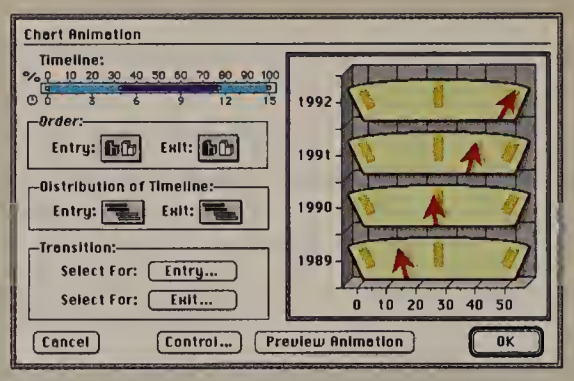


Take Note Persuasion's Player utility lets you annotate on-screen presentations using pencils, erasers, text tools, and an eight-color palette. You can save the markings with the file and edit them later.

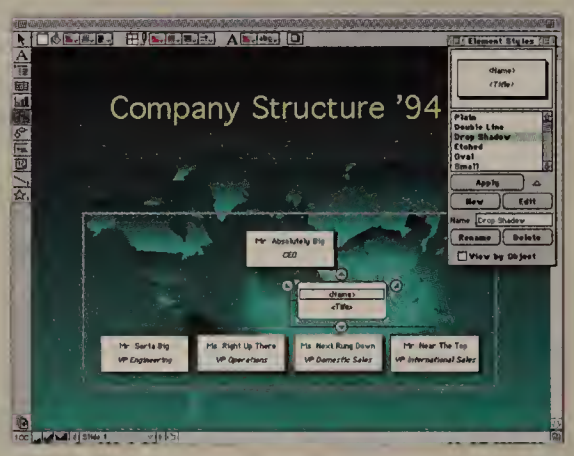
Not everyone needs a traditional presentation program, and some people have specific requirements that Persuasion and PowerPoint simply don't address. Both programs, for example, lack chart-animation capabilities, scientific charts, and integrated graphics functions. These sorts of features are unnecessary for many people who give presentations, but if they're on your list, other products might provide the capabilities you need.

Astound 1.01 For presenting on a large-screen monitor or projection device, Astound is ideal. In addition to the usual stable of slide-production and basic charting options, Astound is packed with animation effects. Its templates can set up amazing animations of text and graphics without your so much as selecting an option.

While Astound's charting is nowhere near as comprehensive as Persuasion's, its chart-animation capabilities are superb. Columns grow out of the horizontal axis, pie wedges fan out into thick slices, and lines draw themselves up and down across the chart. For something even more interesting, experiment with Astound's pictographs. The program includes several animated clip-art sequences for charts, including banners ascending a flagpole and glasses filling with water (see "Automatic Animation").



Automatic Animation Astound provides a handful of animated pictograph templates ready to attach to your data. In this gas gauge example, the arrows move from left to right to match values in the spreadsheet.



Organize Your World ClarisImpact surrounds the active box in an org chart with arrows that add a new manager, coworker, or subordinate with one click, so you're not required to map out the management structure in an outliner and then import it into a chart.

DeltaGraph Pro 3.0.3 Business types aren't the only presenters on earth. Scientists, statisticians, and engineers also have to stand up and speak. And when they do, they're frustrated by the lack of charting options in most presentation packages. Even Persuasion can't match DeltaGraph Pro's variety of chart types. OK, so it can't animate your charts, but DeltaGraph Pro is alone in supplying Pareto-style histograms, triangular ternary charts, spider graphs, Japanese-style candlestick charts, and many others. And if you're overwhelmed by the number of charts available, you can consult the new Chart Adviser, which makes suggestions based on parameters you select.

DeltaGraph Pro 3.0 provides many more presentation functions than its predecessor, including global color schemes and a built-in outliner, bringing it up to speed with PowerPoint 3.0 and even occasionally surpassing it. For example, DeltaGraph Pro is the only program besides Astound that lets you copy text and graphics by dragging and dropping them from one open window to another. But perhaps my favorite new DeltaGraph feature is its list price of $195—less than any other product in this article except Presents III, and worth every penny. Even though DeltaGraph Pro is primarily a graphing package, it earns my vote as the best presentation value on the Mac.

ClarisImpact 1.0 The best way to describe ClarisImpact is as an integrated business-graphics package. Equal parts drawing, desktop publishing, and presentation program, Impact is designed to get new users in the door. To create an organization chart, for example, you simply click on or drag arrow icons to add assistants, subordinates, coworkers, and managers (see "Organize Your World"). ClarisImpact brings this straightforward approach to bear on flowcharts, time lines, and a calendar maker. Who doesn't mention a date or two when making a presentation?

As a straight presentation program, ClarisImpact compares more favorably to Presents III than to Persuasion. Though it supplies the obligatory slide sorter and automated templates, it lacks an outliner, so you have to create your presentation one slide at a time. Also, you can't change the color scheme for your presentation globally, except by introducing a new template, and ClarisImpact's collection of templates is paltry.

Luckily, ClarisImpact's array of general business-graphics capabilities and its straightforward creation options easily make up for some interface complexities. In fact, if I had to select a graphics program—with or without presentation features—to recommend to a nonartist, this would be the one.

you write with any color, not just yellow; supplying a variety of tools, including a text tool and eraser; and allowing you to save your annotations (see "Take Note"). Finally, you can create buttons that jump to specified slides in your document for use in self-running demos and electronic kiosks, or simply for making your own presentations more intuitive and flexible.

Persuasion Wins

Supplying the most features, the friendliest interface, and the best charting module, Persuasion is the clear champion among traditional presentation packages. PowerPoint ranks a close second, however, which brings up an interesting question: If you already own Microsoft Office—which includes PowerPoint—should you also purchase Persuasion? Or is PowerPoint sufficient? Much as I like Persuasion, the truth is that most folks will find PowerPoint more than satisfactory. And if you're willing to wait, PowerPoint 4.0 promises to wow even Persuasion fans. For more on 4.0, see *At Work* news in this issue. **m**

Contributing editor DEKE McCLELLAND has recently given presentations at the Photoshop Conference in San Francisco, at Macworld Expo in Tokyo, and at Photocomp in Miami.

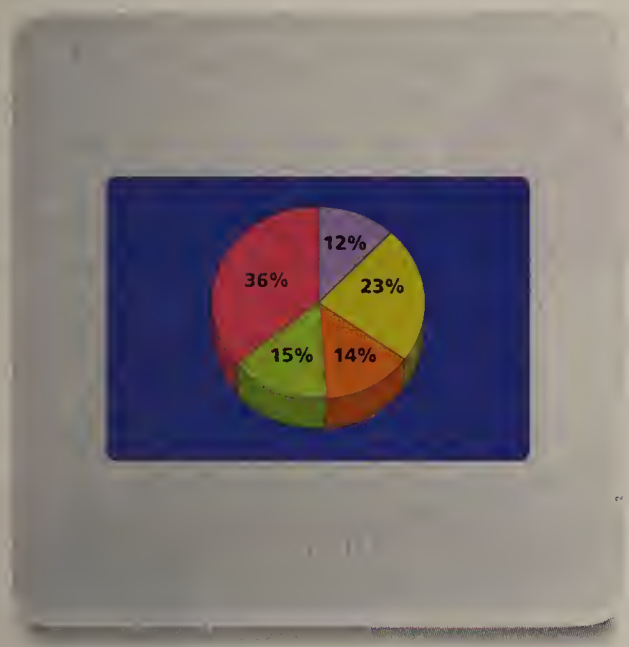
PRESENTATION SOFTWARE

MW EDITORS' CHOICE

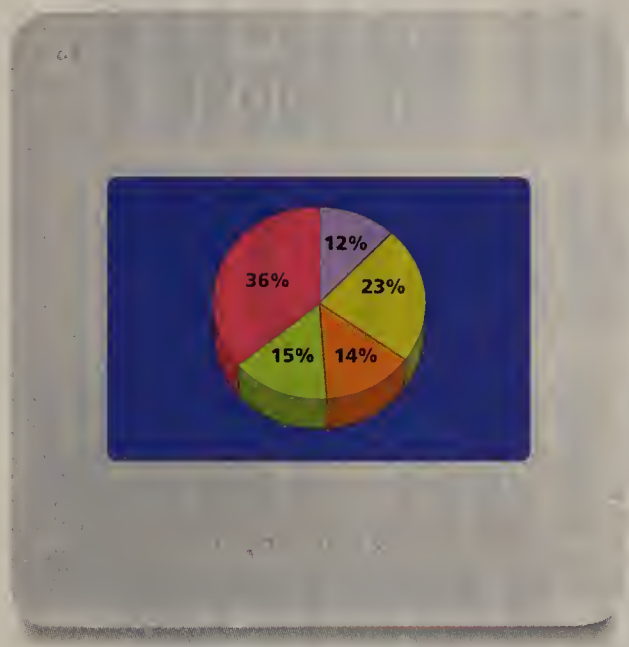
We evaluated presentation products for ease of use and depth of features.

Persuasion 3.0 With its revamped interface, great slide control, vast charting capabilities, and on-screen multimedia options, Persuasion is the best overall. **Company:** Aldus Corporation. **List price:** $495.

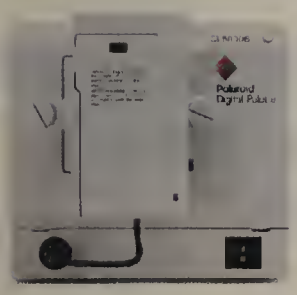
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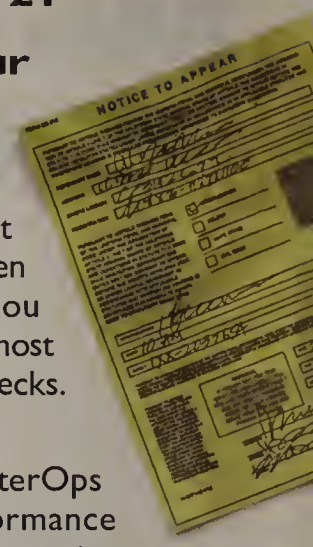
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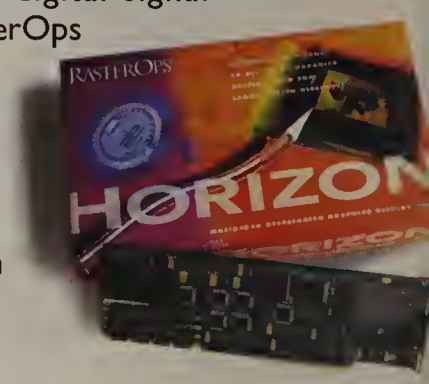
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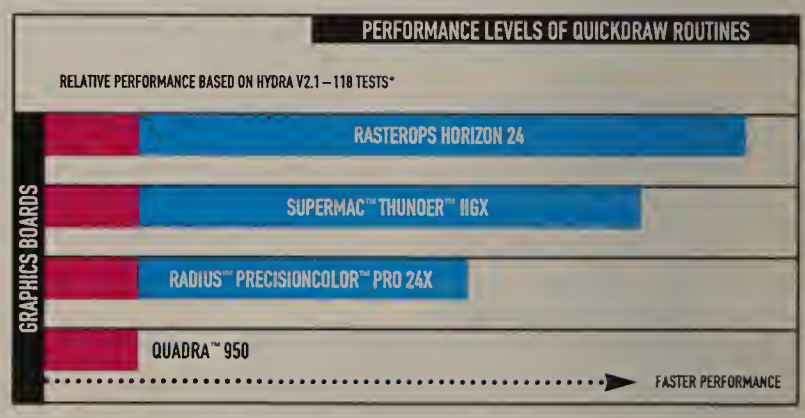
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*Results based on tests run on a Quadra 950 with available products as of 2/1/94

Circle 90 on reader service card



BY LON POOLE

Quick Tips

Tips, Tricks, and Shortcuts

QUICKMAIL LETS YOU USE ADDRESS books to simplify the addressing of messages, but QM Remote doesn't automatically update your address books when you use it to send and receive messages by modem. If you need to send a message with QM Remote to someone whose address is not in your address book, have that person send you a message (which can even be blank). Then simply reply to that message, and QM Remote will fill in the correct address.

You can also use QM Remote to copy and paste addresses to your address books from memos you receive. Here's how: Click the address area of a memo that contains one or more addresses you want to copy, bringing up the addressing dialog box. In that dialog box click the From List button to bring up a dialog box that lists the addressing history of the message (the originator of the message along with all the people who forwarded the message before it reached you). Select one or more of the listed addresses (shift-click or shift-drag to select multiple addresses) and click the Copy button. Dismiss the dialog box by clicking its OK button, and dismiss the addressing dialog box by clicking its Cancel button. Then choose Address Books (⌘-G) from the Mail menu, select the address book to which you want to add the copied addresses, click the Edit button to open the selected address book (or double-click it), and press ⌘-V to paste the copied addresses. Put away the address book by clicking its OK button, and dismiss the address-book-selection dialog box by clicking its Done button.

At any time, you can install an entire address book copied from a Mac that's directly connected to the local network (for example, with LocalTalk, Ethernet, or Apple Remote Access) by dragging the copied address book file to your Address Books folder. The path to that folder is System Folder : Preferences : QuickMail Stuff : Address Books. You can, for example, copy an address book from a networked Mac to a floppy disk or have someone connected to the network enclose it with a QuickMail memo.

Updates

After reading my suggestions in February's *Quick Tips* for graphing mathematical equations, several readers wrote to recommend additional applications. Gerald L. Gottlieb of Chicago uses KaleidaGraph ($155 direct; Synergy Software, 215/779-0522) and notes that DeltaGraph Pro ($129.95 direct; DeltaPoint, 408/648-4000, 800/446-6955) and CA-Cricket Graph ($129 direct; Computer Associates International, 516/342-5224, 800/225-5224) would work too. He says they can plot almost any kind of function (DeltaGraph Pro even has some 3-D capabilities) and let you have fancy axes, grids, labels, and so on. Patrick J. Boyle of Sebastopol, California, finds that PSMathGraphsII ($79.95 direct; Mary Ann Software, 415/662-2486) provides the kind of control a mathematician or scientist needs for producing publication-quality mathematical art. PSMathGraphsII constructs graphs with Bézier curves rather than lots of tiny line segments (the method Wolfram Research's Mathematica uses) and can output a PICT graphic with embedded PostScript (which you could paste into a word processing document) or output a PostScript file (which a page-layout program or a PostScript draw program can import).



In response to my advice in April's *Quick Tips* about connecting two Macs for file sharing, several people suggested using an ordinary serial printer cable (such as a StyleWriter or ImageWriter II cable) instead of network connectors and cable. When a tip in May 1992 recommended this kludge for connecting the Mac to a LaserWriter, one reader reported unreliable printing, and a dealer reported seeing several Macs with serial ports damaged by using serial cables for network connections. Therefore, I recommend spending the extra $30 or less that phone-type network connectors and cable cost. The last thing you need when sharing files is unreliable data transfer.

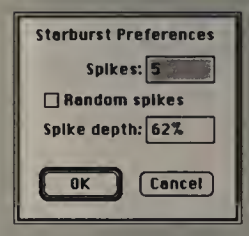
Power Mac Update Worries

Q I have been reading about Macs with PowerPC chips and am pleased to know that most application programs can be used with the help of an on-board emulator until the software

continues

PERFECT POLYGONS

The free Stars and Stripes extension (available from most online services and user groups) adds a Starburst tool to the QuarkXPress tool palette. Few people need to make starbursts often—there are only so many times you want to yell *NEW!* or *FREE!*—but Matthew Frederick of Phoenix discovered you can also use the Starburst tool to create perfect stars and polygons. You double-click the Starburst tool to access the Starburst Preferences dialog box, and change the settings in it as indicated here. While drawing with the Starburst tool, hold down the shift key to keep all sides and angles equal.



Five-Pointed Star
5 spikes, 62% spike depth, rotate result 18°

Six-Pointed Star
6 spikes, 42.5% spike depth, rotate result 30°

Pentagon
5 spikes, 19% spike depth, rotate result 18°

Hexagon
6 spikes, 13% spike depth, rotate result 0°

Other Polygons
Same number of spikes as sides, select Reshape Polygon, delete inner starburst points.

companies upgrade their stuff. But will documents created by the new PowerPC version of an application be readable by the latest 680X0 version of the same application? For example, QuarkXPress 3.1 cannot open documents saved by QuarkXPress 3.2 (and both are 680X0 versions).

Kevin Farley
Holly Hill, Florida

A. It will be a year or two before the Power Mac population becomes large enough that developers of mainstream productivity applications can afford to orphan 680X0 Macs. In the interim I expect Power Mac and 680X0 versions of the same application to be able to open each other's files. However, developers whose software benefits most from extra performance—such as publishing and graphics applications—will let 680X0 versions languish sooner, because users of those products will acquire Power Macs earlier than the average Macintosh user. Check *Macworld*'s *Power Mac News* section for information about specific products, and before you acquire a Power Mac you should ask the companies whose PowerPC versions you plan to obtain about file compatibility.

Power Switching

Q. Is it safe to switch off a Macintosh Classic and an external hard drive from a power switch rather than the built-in switches?

Robert Schnitzer
Redondo Beach, California

A. You can safely turn off everything with a power strip's switch after using the Finder's Shut Down command, and most systems work fine if you turn on the power to all devices at once from the power strip. Some hard drive manufacturers recommend switching on the hard drive first and waiting 15 to 30 seconds so it's ready when you switch on your Mac. However, with an internal hard drive, the drive is powered on at the same time as the Mac, a process that works fine. If your system does have trouble starting up when you turn on everything at once, then use the power-strip switch to turn on everything except the Mac, wait a few seconds, and then turn on the Mac.

It's possible to use the power-on button at the top of your keyboard to switch on an entire system (not just the Mac) by plugging everything into a PowerKey device ($119 retail; Sophisticated Circuits, 206/485-7979, 800/769-3773). It works with most Macs that have an ADB port, including Classics, LCs, and other Macs that don't ordinarily respond to the power-on button. The PowerKey does not work with 100-series PowerBooks.

SimCity 2000 Cheat

TIP You can't embezzle money in SimCity 2000 by typing **FUND** as you can in the original SimCity. Instead, type **porntipsguzzardo** to get $500,000 and everything in the Rewards menu (Mayor's House, City Hall, Arcologies, and more). Additionally, all the inventions become available. You can easily get $500,000 more by repeating the last four letters of the code—**ardo**—at any point until you quit or start a new game.

Robert Petrigliano
Montclair, New Jersey

According to SimCity 2000's publisher, Maxis, this cheat works only in the first edition of the Macintosh version of the game.—L.P.

Scanning Ghosts

TIP When scanning a book page using a flatbed scanner (making sure you're not infringing a copyright, of course), you may get ghosting of the text from the back of the page as the light shines through the paper. If you insert a sheet of black paper behind the page you are scanning, it absorbs the light and eliminates the show-through.

Terry Amthor
Washington, D.C.

Trash Everywhere

TIP I keep an alias of the Trash in each corner of my 17-inch monitor and also in certain folders with a high degree of incoming and outgoing files, such as my BBS download folder. I find it convenient to always have the Trash within reach without a window blocking it.

Charles Dill
San Francisco, California

Changing Your Cover

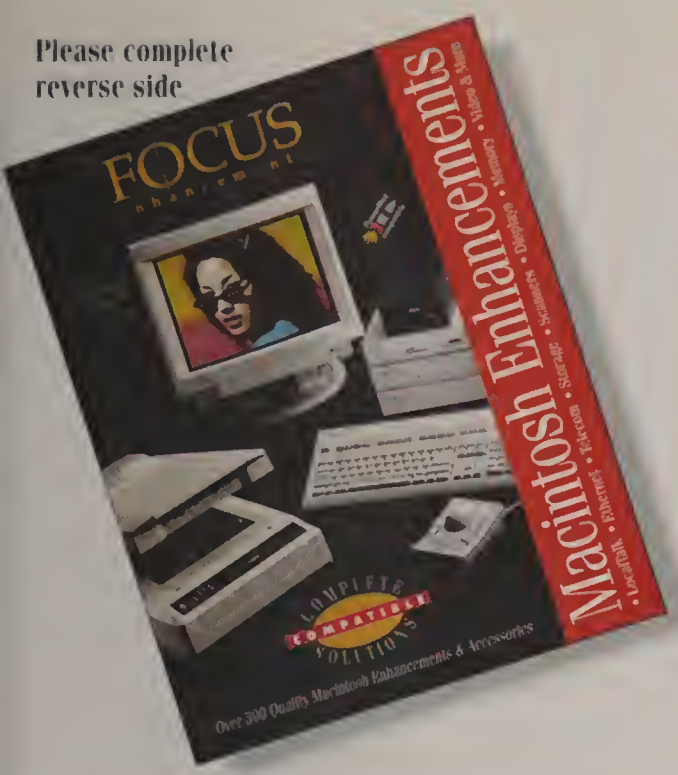
TIP The Fax Center program that comes with Global Village Communication modems is great for making new cover sheets, but it's a pain when you have to correct or change the background graphics in an existing cover sheet. After modifying the graphics in a draw program and saving the result as a PICT file (easy enough), you must import that file as a new cover sheet, reposition all the cover-sheet fields (date, destination, fax number, memo, and so on) one by one, and change the fields' font, size, and style (unless you like Chicago 12, the default for new cover sheets). You can use ResEdit to avoid that hassle.

First make your changes to the cover-sheet graphics with a draw program such as SuperPaint or Canvas, or the graphics module in ClarisWorks. (The folder path to the cover-sheet documents is System Folder : GlobalFax Documents : Cover Sheets.) In the draw program you can see and change the cover-sheet graphics but not the cover-sheet fields. If you move any graphic objects that act as field borders or field labels, you will probably have to adjust field positions later in the Fax Center program (not a big deal). Use the Save As command to save the modified cover sheet in PICT format with a new name, and then close it.

Next open the original, unmodified cover-sheet document in ResEdit. Choose Select All and then Copy from the Edit menu. Close the original document. Then use ResEdit to open the

continues

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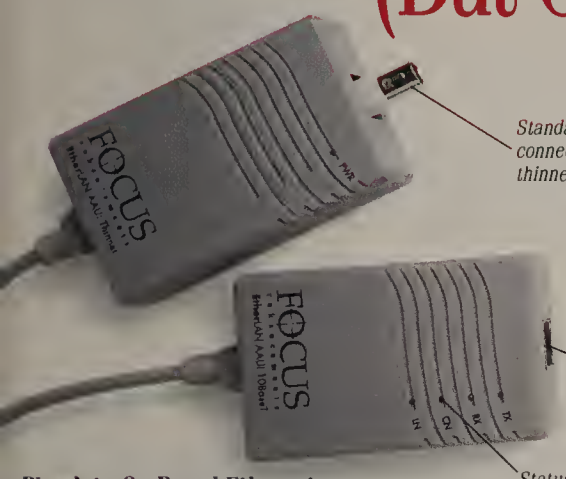
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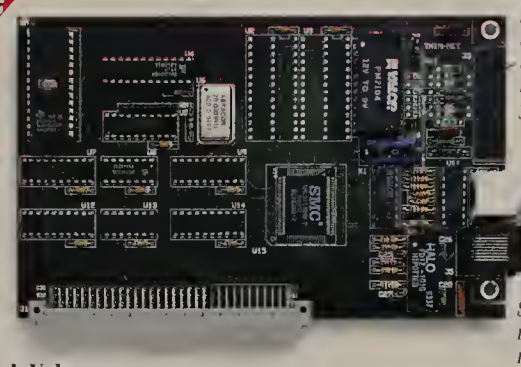
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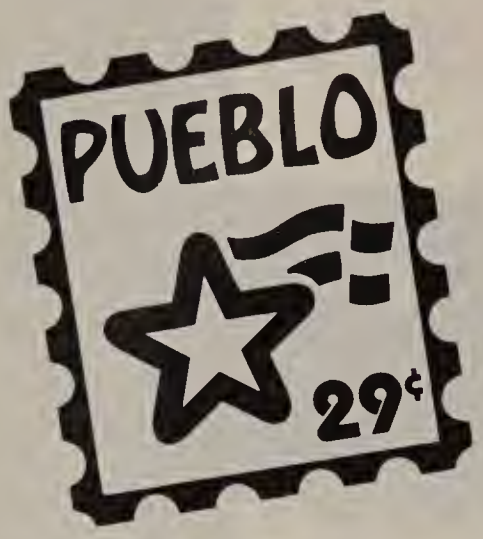
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Circle 201 on reader service card

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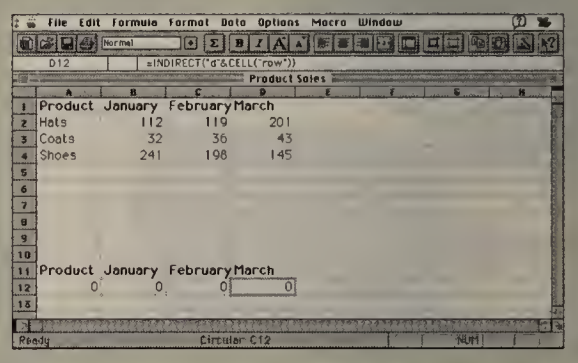
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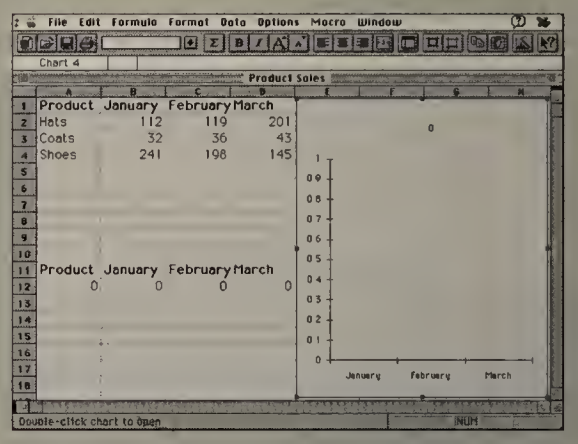
DYNAMIC GRAPHING

You can create a Microsoft Excel 4.0 chart that dynamically changes as you select different lines in a spreadsheet, always graphing the currently selected line. Shane Devenshire of Walnut Creek, California, has devised a simple method that achieves this effect without macros or formula changes. The following steps illustrate this method with a sample table of product-sales figures.

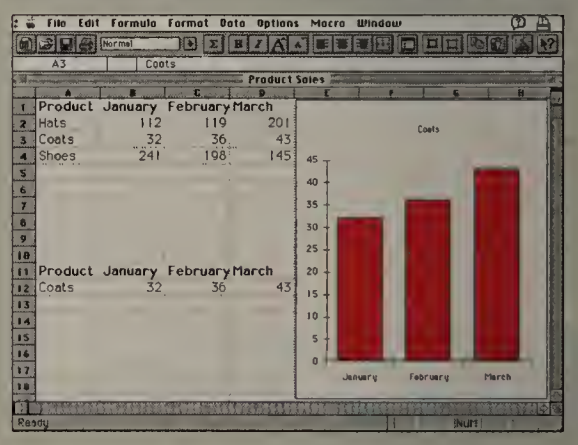
1. Enter the column headings and data in a table (cells A1:D4) and copy the column headings to any available empty area (cells A11:D11). In the cell under the first copied heading, enter the formula **=INDIRECT ("a"&CELL("row"))**. Do not be alarmed if Excel displays a message that it cannot resolve circular references; they are a temporary artifact of this setup step. Copy this formula to the cells under the other headings (cells B12:D12). Change the ***a*** to ***b*** in the first copied formula (cell B12), to ***c*** in the second copied formula (cell C12), and so on.



2. Highlight the copied headings and the formulas (cells A11:D12), click the Chart Wizard button in the tool bar, drag in the spreadsheet to indicate where you want to embed your dynamic chart, and in the Chart Wizard dialog box, click the >> button to create a basic column chart. Alternatively, you can use the Next button in the Chart Wizard dialog box to select a custom chart format (like the one shown here).



3. To see the dynamic chart in action, select any cell in the original data table (in row 2, 3, or 4) and press ⌘–equal sign (=) to calculate now. The chart changes to graph the data from the row in which you selected a cell.



This method demonstrates a little-known feature of the Cell function: omitting the second argument of the Cell function makes Excel use the currently selected cell. This method also illustrates calculating a cell reference and getting the cell's value with the Indirect function.

modified cover-sheet document, and choose Paste from the Edit menu. From ResEdit's File menu choose Get Info for *your document*, and in the dialog box that appears change the Creator item to GVCi (capitalization matters here), thereby identifying the modified cover sheet as a Fax Center document. Save and close the document.

Finally, use the Fax Center program to open the modified cover sheet and adjust the positions of any fields whose labels you changed in the draw program.

Chris Stone
Yamanashi-ken, Japan

We pay from $25 to $100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the address listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses. **m**

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld Guide to System 7.1, 2nd Edition* (IDG Books Worldwide, 1993).

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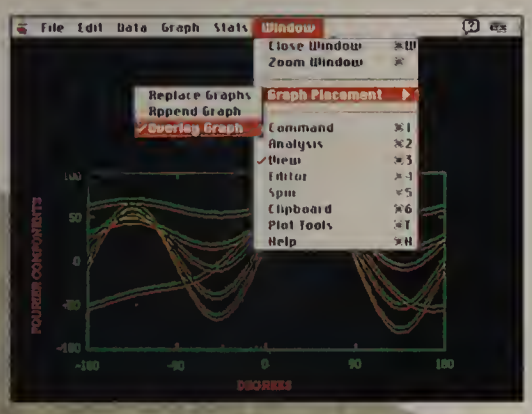
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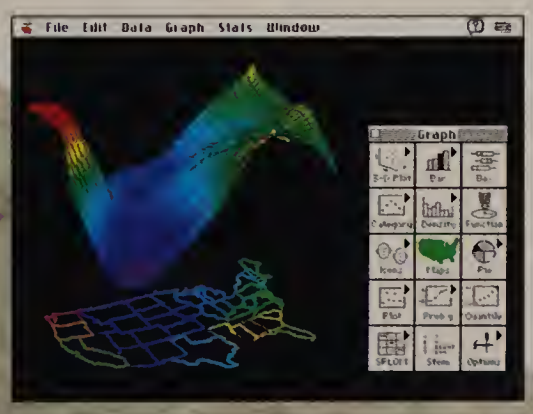
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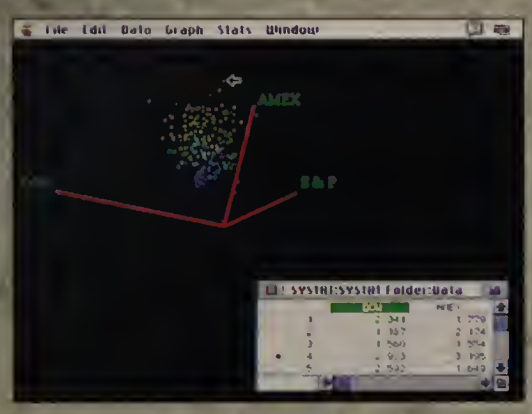
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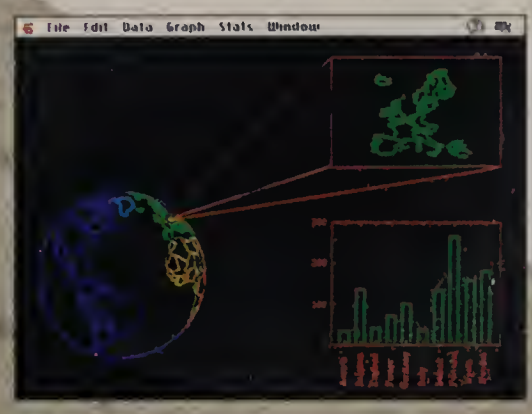












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NetWare Cachet for Power Mac Servers



STEPHEN DURKE

APPLE'S NEW POWERPC-BASED SERVers waltzed in this spring to the sweet music of promises that Novell's NetWare 4.X will someday run on the blazingly fast RISC-based servers. For the present, however, there is no server software that can take full advantage of the new PowerPC 601 processor used in the Workgroup Servers 6150, 8150, and 9150.

Based on the pizza-box–shaped Power Mac 6100/60, the Workgroup Server 6150 ($4200 to $5000) comes with AppleShare 4.0.2, an upgrade that runs on a PowerPC-based machine. Running the 60MHz PowerPC 601 chip, the WS 6150 comes with 8MB of RAM, with room for up to 72MB. It ships with a 256K RAM cache, a single PDS expansion slot (convertible to a short NuBus slot using Apple's $99 adapter), on-board Ethernet, a CD-ROM drive, a floppy drive, and one 500MB internal hard drive.

Both the Workgroup Server 8150 ($7500 to $10,000) and 9150 ($10,300 to $15,000) use the 80MHz PowerPC 601.

Housed in the same squat case as its AWS 80 counterpart, the WS 8150 comes with 16MB of memory (expandable to 264M), a 256K cache, three standard NuBus90 slots, on-board Ethernet, a CD-ROM drive, a floppy drive, a DAT drive, and a 1GB internal hard drive.

The WS 9150 comes in the improved, tower-style case of the AWS 95 and supports up to eight internal devices. It ships with two 1GB internal hard drives, a CD-ROM reader, a DAT drive, and a floppy drive, with room for three other half-height internal drives. Standard configuration includes 16MB of memory (expandable to 264MB), a 512K RAM cache card, four NuBus90 slots, plus one PDS slot. It also offers a SCSI-2 bus for attaching up to seven external drives. Unlike the AWS 95, however, the 9150 does not offer an accelerated SCSI bus and cannot run AppleShare Pro, the server software that depends on A/UX, which has not yet been adapted to run on the PowerPC chip.

Users of the 8150 and the 9150 will be able to buy NetWare or AppleShare separately. Since AppleShare 4.0.2 depends on elements of the Macintosh Operating System that haven't been converted to native PowerPC code, AppleShare can't now run any faster on PowerPC-based Mac servers than on 68040-based Macs. Apple would not say when native AppleShare would be available.

Novell plans to release NetWare for PowerPC by year's end, with a new Mac client capable of using NetWare 4.X's directory services, something the current Mac client can't do. However, the client will still use AppleTalk (rather than IPX) to access a server that is based on AppleShare Filing Protocol and runs within NetWare for file and print services, meaning that initially Mac clients won't benefit much from the hardware's speed. Novell says subsequent versions will gradually add more access to native NetWare protocols so that Macs get faster, more fully functional access to NetWare servers of all types. (Ironically, Windows, DOS, and Unix NetWare clients will immediately reap the speed benefits if they connect to Mac servers running NetWare for PowerPC.)

Although counting on NetWare to serve as its high-end server software, Apple will continue to develop AppleShare for small and medium-size, mostly Macintosh networks. For the few Intel-based machines in these setups, Apple has reassumed from Farallon Computing the development of an AppleShare client for DOS and Windows.

The WS 8150 and 9150 ship with software that allows users to create RAID Levels 0 and 1 (striping and mirroring). They also include Dantz Development's native PowerPC Retrospect Remote server software and licenses for three clients.

Apple will ship PowerPC upgrades for the AWS 60 ($1259), AWS 80 ($1899), and Quadra 900 or 950 ($2499). Apple, 408/996-1010; Novell, 801/429-5900, 800/638-9273.—MARGIE WYLIE

AppleShare 4's Secret

HOW WOULD YOU LIKE TO RUN speedy AppleShare 4.0 for the $699 cost of upgrading the software—without the additional cost of a Quadra?

Using a ResEdit fix to bypass the software's test for an 68040-based processor, users have found that AppleShare 4.0 runs just fine on the Mac IIfx and IIci machines they already own, allowing them to boost server speed without allocating a Quadra.

Apple admits that there's nothing inherent in AppleShare 4.0 that limits it to running on Quadras. The company says it made a "marketing decision" to artifically limit the server software to 040-based Quadra hardware for a number of reasons. According to product manager Gary Schare, even with AppleShare 4.0's extensive caching systems, it outperforms AppleShare 3.X by a mere 10 to 20 percent running on a 68030. The software operates 200 to 300 percent faster than 3.X when running on an 040, Schare claims. A user who has been running AppleShare 4.0 on a Mac IIfx for six months, however, claims that in a side-by-side comparison, AppleShare 4.0 reads and writes at about 70 percent the speed of the same software running on a Quadra 700. Subjectively, network users reported that navigating the server's files and folders with 4.0 on a Mac IIfx seems nearly as fast as on a Quadra 700.

Apple says that testing and tailoring 4.0 for a single Mac processor cut down on development costs and time to market. The company says it is only looking out for the best interest of its customers who need to start migrating to Quadras so that they can then upgrade to PowerPC. Besides this gentle persuasion, Apple holds a trump card: if you patch AppleShare 4.0 so it runs on a lesser processor, Apple refuses to support the patched software.

The Patch

Making the following modifications to AppleShare 4.0 or 4.0.1 will allow you to run the server software on a Mac IIfx or IIci. Technically, these steps do not modify the AppleShare code itself, only the parameters used to check if Apple allows the code to run on the machine. (The fix changes the required minimum processor from a 68040 to a 68020.)

You can modify an installed server; modify a new server after installation and then apply AppleShare TuneUp 4.0.1 before launching AppleShare Admin.

1. Open a copy of the AppleShare File Server extension with ResEdit; keep the original extension in a separate folder. (You should never change your original AppleShare 4.0.)
2. While pressing the option key, open the GNRL ID #259 resource.
3. Change the initial 0005 to 0003.
4. Save and close the AppleShare File Server extension.
5. Open a copy of the AppleShare Admin application. Then modify the GNRL ID #256 resource, as in steps 2, 3, and 4.
6. Open a copy of the AppleShare Print Server application. Then modify the GNRL ID #256 resource, as in steps 2, 3, and 4.
7. Restart the server.

Macworld Lab tested this patch using AppleShare 4.0.1 on a Mac IIfx. We don't recommend using this patch to run AppleShare 4.0 on any pre-IIci machines.
—MARGIE WYLIE AND MATT CLARK

IN BRIEF

■ **DataClub's Demise** Novell has discontinued the Mac-based virtual-server networking software it acquired from International Business Systems. Owners of some DataClub versions can trade up to NetWare server software or AppleShare 4.0. Novell, 510/975-4491, 800/638-9273; Apple, 408/996-1010, 800/767-2775.

■ **DaVinci Upgrade** DaVinci Systems has finally released its fully functional Macintosh product. Based on the NetWare Message Handling Service (MHS), DaVinci eMail for the Macintosh v2.5 ($595) fully interoperates with and offers the same functionality as the company's DOS and Windows E-mail. 919/881-4320.

■ **Security Net** Network Security Guard 2.0.1 from MR Mac Software scans AppleTalk networks and compiles reports detailing shared files, folders, and volumes. It also points up risky behavior, such as guest access to an entire hard disk or an application; scans for specific file names; and runs scheduled unattended scans. Three-, ten-, and unlimited-zone versions cost $89, $169, and $210, respectively. MR Mac Software, 619/453-2845, 800/566-7622.

Streamlined ARA Servers

DAYNA COMMUNICATIONS AND Shiva Corporation have both announced Apple Remote Access servers that promise to do away with external modems, power supplies, and extra cabling. Both servers are ARA 2.0–compatible but not yet compliant with that version, meaning users can't access any new 2.0 features (see *Networks* news, *Macworld*, June 1994). Both also include thick and thin coax and 10BaseT connectors.



The Shiva LanRover/Plus ARA server supports many protocols.

Dayna's DaynaLink (under $3000) features eight PCMCIA Type II slots into which you can plug just about any third-party PCMCIA modem. When it ships at the end of June, the DaynaLink will support only AppleTalk, but IPX and TCP/IP support are in the works.

Shiva's LanRover/Plus ARA server ($4299 to $8499), based on the LanRover/E design, includes eight slots that can be filled with either modems or cards that provide standard serial ports for external modems or high-speed communications links.

Shiva's server supports multiple protocols, including AppleTalk, IPX, TCP/IP, and NetBEUI; is SNMP-manageable; and allows users to dial out through the LanRover/Plus as if it were a NetModem.

Dayna Communications, 801/269-7200, 800/531-0600; Shiva, 617/270-8300, 800/458-3550.—CAMERON CROTTY

Solving

Protocol analyzers help you identify trouble on the LAN



PETER HOEY

BY JOEL SNYDER

Your clients are complaining and sound increasingly frustrated. Some of the servers on the network you manage seem to play hide-and-seek whenever a user looks for them in the Chooser. You realize that the problem must be a recalcitrant root server screwing up your AppleTalk zones. But which root server?

Every LAN manager needs a protocol analyzer to help solve this kind of network anomaly. A protocol analyzer can capture all the packets on a network (even those addressed to another station), store the packets in a buffer, and decode the network-protocol information to show what's happening on a network. When a network is running fine, an analyzer can check network usage levels, but the most common reason to buy an analyzer is to help track down network problems.

The most popular protocol analyzers run on MS-DOS laptops, cost a ton of money, and have poor user interfaces. If you've put off spending hard-earned money for that, rest easy: you can now get a top-quality analyzer—plus the PowerBook to run it on—for about $3500. I tested Cabletron Systems' MacLanview, Neon Software's NetMinder series (NetMinder Ethernet and NetMinder LocalTalk), and AG Group's Peek series (EtherPeek, LocalPeek, and TokenPeek). The results were encouraging. Mac network managers can now choose from several easy-to-use, versatile products that are powerful enough to help solve real-world network problems.

Protocol analysis is a three-step process. First, you decide which traffic you need to look at. Next, you capture the traffic with the protocol analyzer. Third, you examine the captured frames to see what the problem is. (Ideally, you should be able to capture everything and then whittle down from there. Both NetMinder Ethernet and EtherPeek let you do this by filtering frames after capturing them; MacLanview doesn't.)

To test these analyzers, I set up a network with a mixture of protocols, including AppleTalk, TCP/IP, DECnet, NetWare's IPX, and Open Systems Interconnection (OSI). I tested the Ethernet versions of the product, though everything that applies to Ethernet also applies to LocalTalk versions.

To see how the software behaves in a portable environment, I tried three PowerBooks: a 100, a 145, and a 160. Connecting a PowerBook to Ethernet requires an external SCSI-to-Ethernet adapter. I used the Asanté Mini EN/SC, a top performer (see "The SCSI-to-Ethernet Connection," *Macworld*, January 1994), to test NetMinder Ethernet and EtherPeek; I used the Cabletron EA412 SCSI-Ethernet adapter to test MacLanview. For a desktop Macintosh, I used a Quadra 800 with a Cabletron E6100 DNI Ethernet card in it. (Cabletron only supports MacLanview on a Cabletron Ethernet adapter.)

If you plan to run these analyzers on your desktop Mac, install an Ethernet card for the analyzer's exclusive use.

Network Mysteries

Because the analyzers intercept all network traffic, anything else (such as AppleTalk or TCP/IP) using your normal Ethernet interface will be disconnected. I saw many crashes when trying to switch between protocol-analyzer mode and normal Macintosh mode on the same interface (something the software manufacturers specifically discourage).

All three packages performed adequately well. On the Quadra 800 with an Ethernet loaded to 6MB per second, the packages caught most everything. The PowerBook 100 lost packets as loads went above 0.5 MBps; on the PowerBook 145, loads above 1.2 MBps showed packet loss; and at 1.5 MBps the PowerBook 160 locked up. For serious protocol analysis, faster PowerBooks are better.

Capturing Network Packets

Capturing traffic with any of the three packages is simple: click on the Start button, and away they go. A main window gives brief information on each frame, scrolling as frames are captured. The analyzers also display statistics during capture, such as the type of frames, the network bandwidth used, and what nodes are sending and receiving traffic.

On a 21-inch screen, MacLanview and EtherPeek offer the most flexibility. Both allow you to resize windows to show more or less information. EtherPeek and NetMinder Ethernet also color packets, turning an Ethernet frame-trace into a Technicolor display. On a PowerBook, MacLanview and NetMinder Ethernet win points for cramming the most information into the smallest space. That feature becomes a detriment, though, when you have lots of screen real estate, since it circumscribes the amount of information that you can display.

On a multiprotocol Ethernet, capturing just the frames you're looking for can be difficult. Busy Ethernets create another problem: I filled up a 16MB buffer in less than a minute with 40,000 medium-size frames. So it's important to be able to capture and store a lot of data that you can sift through later.

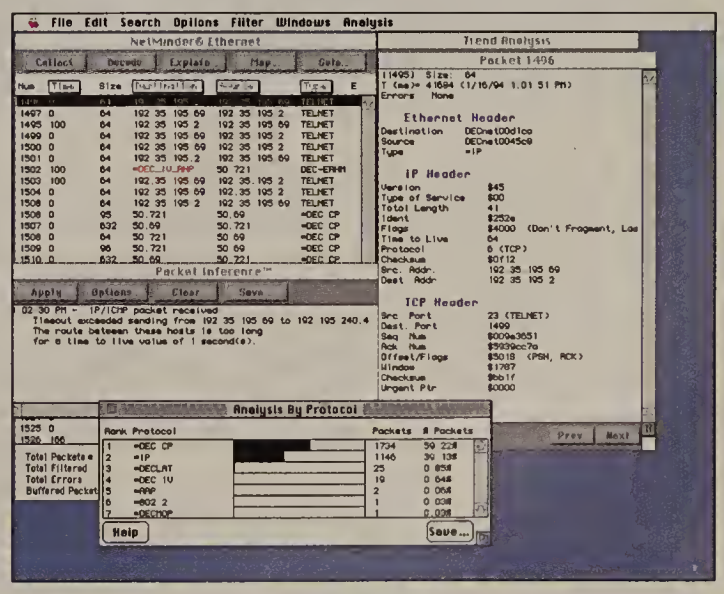
To see how efficiently the packages use memory, I gave each application 2MB of memory and then collected the same data stream with each. All three held about 11,000 short frames. If you have more disk space than memory, EtherPeek has a valuable feature that lets you automatically store accumulated frames on disk and continue capturing. NetMinder Ethernet won't do that, but it will maintain a sliding window, throwing out old frames to hold new ones. MacLanview came in last in this area. When its buffer is full, it's full, and that's all there is to it.

To overcome this limitation, all three packages offer *triggers* and *filters*. Triggers start capturing frames when a specific event has occurred, such as when a particular type of packet goes ("next time the Jan router sends an RTMP update packet, start capturing") or at a specific time ("start capturing at 1:17 a.m."). Each package has ample trigger capabilities.

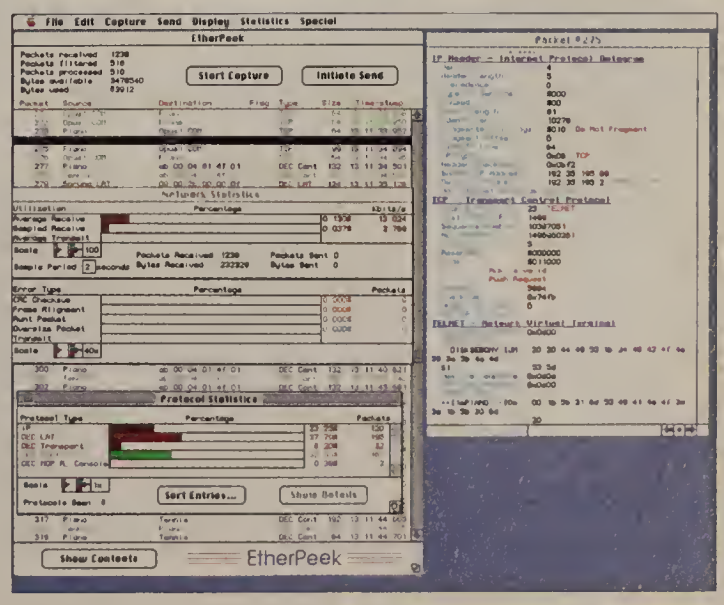
Filters tell the protocol analyzer which frames to keep and which to discard. Setting up filters in MacLanview can be very difficult. Filters based on station address or frame type are a few clicks away. A filter based on higher-level protocol information, such as filtering out all AppleTalk printer traffic, is almost impossible to get right. EtherPeek improves on MacLanview by including hundreds of sample filters. Starting with a sample similar to what I wanted, it took only a trivial effort to make the perfect filter. NetMinder Ethernet lets you build most filters with a minimum knowledge of protocol internals. The downside of a simpler interface is that some operations that are possible in EtherPeek (such as matching multiple fields in the same filter) just can't be done in NetMinder Ethernet.

MacLanview supports up to six filters active at any time. NetMinder Ethernet allows only five. EtherPeek has effectively no limit on the number of filters that can be active at any one time. The number of filters you need depends on the complexity of your task. A serious network problem can require more than five filters, but network managers responsible for only a few protocols will not find a five-filter limitation onerous.

It was when I was creating filters that I first had to break into the documentation. MacLanview's documentation has the best layout, making it easy to find information. MacLanview and NetMinder Ethernet include tutorial information on analyzing Ethernets, something EtherPeek leaves out. With all the packages, though, it was often simpler to try something and see how it worked than to



NetMinder Summary NetMinder Ethernet's main window shows a one-line summary of each frame on the network. To see exactly what's inside a frame, double-click on its line; NetMinder Ethernet then brings up a window explaining each field and subfield of each protocol in the frame.



EtherPeek Statistics EtherPeek offers a variety of statistics and protocol-analysis windows to help isolate performance problems. Packet summaries, detailed information on particular frames, and network traffic loads are, all at the same time, only a few mouse-clicks away. Statistics windows show which nodes are sending and receiving most of the traffic.

Analyzing Protocol Analyzers

	AG Group	Neon Software	Cabletron Systems
Ethernet product/ price	EtherPeek 2.0.3/$795	NetMinder Ethernet 3.01/$595	MacLanview 2.00.02/$1495
LocalTalk product/ price	LocalPeek 2.0.3/$495	NetMinder LocalTalk 1.1.1/$395	*
Token Ring product/price	TokenPeek 2.0.3/$995	NA	*
FDDI	NA	NA	**
Phone	510/937-7900	510/283-9771	603/332-9400
Toll-free phone	800/466-2447	800/334-6366	none
Protocols decoded	AppleTalk, TCP/IP, XNS, DECnet, LAT, NetWare's IPX, Banyan VINES, SNA, ISO NL & TL, SMB, NetBEUI, NetBIOS, OSI	802.2, 802.3, AppleTalk, Netway 1000, TCP/IP, XNS, DECnet, LAT, NetWare's IPX, Bridge/3Com, Banyan VINES	802.2, 802.3, 802.5, AppleTalk, TCP/IP, XNS, DECnet, LAT, NetWare's IPX, Banyan VINES, ISO NL & TL, NetBIOS, SMB, Cabletron
Online help	no	yes	no
Filters (maximum)	32,000	5	6
Generate network traffic	yes	no	yes
Remote capture	yes	yes	no
Filter after capture	yes	yes	no
Statistics and graphs	built-in	built-in and via Excel	built-in
Trigger basis	filter or absolute time	filter, relative time, absolute time, traffic, or error level	filter
Alarms	new node, new protocol, threshold (high), network intruder	various, included in packet inference	new node, threshold (high/low), network errors, network intruder
Capture buffer options	clear buffer and continue; save to disk and continue	stop when full; clear oldest packets and continue	stop when full; clear buffer and continue

*NA = not available. * Included in MacLanview package. ** Product should be available by September 1994.*

puzzle through confusing manuals.

Only NetMinder Ethernet comes with online help, as a combination of balloon help, a liberal assortment of help buttons, and some protocol tutorial information (available through an Explain button) that could be helpful to novice users.

From Capturing to Decoding

Once I captured a buffer full of frames, I broke up and deciphered what they meant to the health of the network—a procedure called *decoding*. In this tricky process, a protocol analyzer can really make your life easy. All three packages claim to decode a wide variety of protocols; the difference is in the details.

MacLanview's decodes always appear in its main window, as tightly summarized information. This summarized data is good for a quick look at your network, but most problems require more data than MacLanview provides. Double-click on a particular Ethernet frame, and you get a window showing the raw frame data—in other words, the actual contents of the packet. (That's what makes protocol analyzers dangerous in the hands of hackers or snoops, who can capture E-mail, passwords, or other sensitive data.)

Conversely, EtherPeek and NetMinder Ethernet decode protocol frames on command: double-click on a frame, and up comes a decode window showing each field inside the frame for each level of protocol.

EtherPeek has the most versatile decoding capabilities, offering multiple decoders for many different packet types. NetMinder Ethernet also did an excellent job, figuring out almost all the packets I threw at it. For these two products, your main concern is to make sure that the protocols on your LAN are included in the product you buy (see "Analyzing Protocol Analyzers"). Serious network managers should also get a good protocol reference book, such as Matthew Naugle's *Network Protocol Handbook* ($49.50, McGraw-Hill, 1994). MacLanview's decodes were almost useless above the network layer. It took 40 minutes with detailed protocol specifications to figure out what was instantly revealed in EtherPeek and NetMinder Ethernet.

Pick the Right Features

To choose the appropriate product, look at features and ease of use. My favorite is AG Group's EtherPeek. I was impressed with its powerful filtering capabilities, which let me grab the packets I needed more easily than did NetMinder Ethernet or MacLanview. Experienced network programmers or managers will find this a quality tool.

For novice managers, Neon Software's NetMinder Ethernet may be the best choice. Its new Packet Inference feature helps detect potential protocol errors and network problems, such as new nodes, routing misconfigurations, excessive error rates, and unreachable systems. Packet Inference, combined with NetMinder Ethernet's online help can guide beginners through the complex world of protocol analysis. Cabletron's MacLanview comes in third. Its PowerBook-friendly display and trimmed-down interface are strong features, but the difficulty of filtering packets is something that Cabletron has to work on. **m**

JOEL SNYDER is senior analyst with Opus One, a consulting firm in Tucson, Arizona. He specializes in networks and the international aspects of information technology.

PROTOCOL ANALYZERS

MW EDITORS' CHOICE

We looked for the right balance of well-designed features and a clear interface to handle often-daunting network chores.

EtherPeek Powerful and flexible filtering and decoding capabilities distinguish this product from its competitors. EtherPeek's many features will appeal to experienced network managers, but its simple interface can put the novice at ease. **Company:** AG Group. **Price:** $795.

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MIS Director

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Circle 269 on reader service card



BY CARY LU

PowerBook Notes

Free and Low-Cost Utilities

WITH ITS NEW POWERBOOKS, APPLE HAS at last begun shipping a full complement of software tailored to portable computing. Out of the software listed in "PowerBooks: The Next Generation," in this issue, every PowerBook owner should at least have Apple's PowerBook control panel 7.2. Many will also find Apple's Control Strip and File Assistant appealing. File Assistant is sold by Apple for about $65; at press time, Apple had not announced how PowerBook owners could get the PowerBook control panel and Control Strip.

There are many other ways to handle the host of little functions that can enhance and/or simplify PowerBook operations. For example, you can buy one of the big commercial utility packages, such as Connectix PowerBook Utilities. Here, though, I focus on Apple's software and on free and low-priced shareware utilities.

Power Management

The PowerBook control panel 7.2 (which first shipped with the Duo 250 and 270c) still has a single slider for power management, with the Better Conservation setting at one end and Better Performance at the other. That was the only control in version 7.1; but if you switch to the Custom setting in 7.2, you can individually set time delays for sleep, hard drive spindown, and screen backlighting. You can also override Apple's default settings for battery and AC power.

Apple's new Control Strip gives you fairly quick access to the PowerBook control panel and other power-management features (see "Take Control" in "PowerBooks: The Next Generation" in this issue). However, Control Strip has some



potential problems. It uses up screen real estate—its floating window cannot be covered up by application windows. Although you can collapse the strip to a short stub, even the stub can get in the way. Second, Control Strip's default location in the lower left corner of the screen is not ideal, since many programs use that area to display information. So to keep the strip away from active windows, I usually put it in either the upper or lower right corner, near the disk icon or the Trash Can (hold down the option key and drag the strip).

To use Control Strip to spin down the hard drive or put the PowerBook to sleep, you must open the strip, select an icon, and set the switch. Keyboard commands are much faster. The Toolbox in Apple File Assistant gives you function keys for hard drive spin-down (shift-control-⌘-0) or sleep (shift ⌘-0).

Several shareware and freeware programs also give you keyboard controls. Jon Pugh's ToggleAT Fkey 3.0 (pay whatever you want) switches AppleTalk—if it's loaded—on or off. PowerSleep Fkey 1.0 (free; by Urs Calibran, Stefan Frey, and Alexis Gehrt) invokes sleep, first turning off AppleTalk if necessary. Bill Steinberg's SpinD 1.0 (free) spins down the hard drive.

Many programs, including Control Strip, display battery status with a gauge; some estimate the time remaining. But unless you have a new 500-series PowerBook with "intelligent" batteries, such a display offers little more information than does the simple battery control panel included with every PowerBook.

Some gauge programs do offer special features. Volts 1.3.1, a $5 application by Lawrence Anthony, gives you the option of graphing voltage levels over time, in a choice of three formats.

Three shareware programs by Jeremy Kezer deal with battery power; all offer additional features when you register and receive your password. MyBattery 2.2.2 ($10) shows the voltage levels for three different batteries, and it lets you switch AppleTalk and your modem on and off. Threshold 1.0.2 ($10) resets the voltages for first and second low-power warnings and for final shutdown as you run out of battery power. You can reset the threshold for an external battery, or—if you have a PowerBook 140 or 170 and the new type of higher-capacity internal battery—you can get a little more battery life by setting a lower threshold. DeepDischarge 1.0.2 ($5) runs the battery down to prepare for recharging; it works like an external conditioner except that it doesn't start recharging automatically—you have to do it manually.

continues

Plug Alert 1.0.1 (free) by Sean Hummel puts very clear warnings on screen if the AC adapter isn't getting power or if its plug has slipped out.

Keyboard Utilities

No PowerBook keyboard has the full set of keys found on an Apple Extended Keyboard. Even the new 500-series PowerBook keyboards include just 12 of the 21 function keys (F1 through F12), and none of the 18 keypad keys. Several programs remap the F-keys onto PowerBook keyboards, mostly by using the control key in combination with another key. The most complete F-key program—better than any commercial program—is Keyboard Plus 1.1.1, a $15 shareware control panel by Berrie Kremers. It maps all keypad and function keys and it also supports compound keys (option-F1, for example).

Many PowerBook users frequently hit the caps lock key by accident. Apple's Caps Lock extension shows the caps lock status in the menu bar—but you'll see it only if you are looking for it. On the other hand, Ed Ludwig's Caps Lock Notify (free) puts a prominent notification on screen each time you hit the key. Other programs, including S. Kevin Hester's free CapsControl 1.02, simply disable the caps lock key altogether.

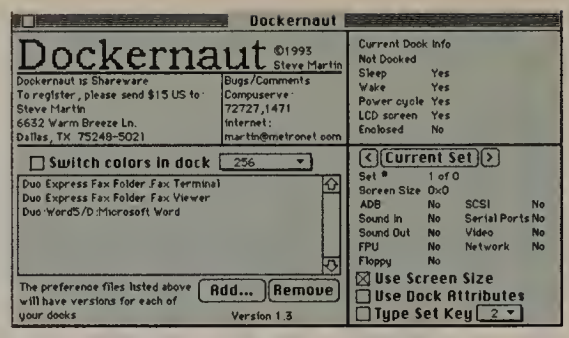
Screen and Sound Utilities

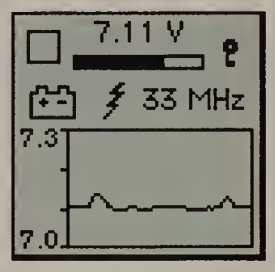
Backlight Control 1.0a3, a free control panel by Ricardo Batista, conserves power by turning off the backlight after a specified period of inactivity. (You don't need this if you have PowerBook control panel 7.2.)

The Fat Cursors 1.1 control panel ($5) by Robert Abatecola enlarges the arrow and the I-beam cursor, improving visibility on a passive matrix screen. The Find Cursor 1.0 extension (free) by Mike Samuels puts a box around the cursor if you hold down the control key and click the mouse or trackball button. These programs work well together.

Two programs simplify changing the screen bit-depth (number of grays or colors) and the sound level. Ambrosia Software's ColorSwitch 2.3.0 ($10) adds an icon to the menu bar for changing the volume level and bit depth without leaving your application. Grant Dair's free Fast Switches 1.0.0 includes six bit-depth switches and eight volume switches that set to volume levels 0 through 8. Typically, you need only two or three of the switches; simply run the application for the screen depth and volume level you want. But you have to leave your current application to run Fast Switches.

An annoying sound problem of PowerBooks results from one of their power-saving techniques: after about ten seconds of inactivity the sound circuit shuts down. When the sound circuit turns back on, you hear a click. Shhh! (no version number) by Patrick C. Beard, a free extension, patches the Sound Manager to prevent the sound circuit from shutting down—at a very slight cost in battery life—thus avoiding the click.





Dockernaut (above) manages screen settings and software preferences for a docked Duo. Volts (left) displays power status and graphs voltage over the battery's most recent two minutes of use.

System Utilities

Insomniac 1.0.2 ($10) from Jeremy Kezer sets as many as 50 scheduled times at which a PowerBook will wake up. It works with the PowerBook 100, the Duos, and the new 500 series. For example, you can set a Duo to send electronic mail or a fax when phone rates are lowest, or when the receiving fax device is least likely to be in use. Insomniac does not shut down the computer.

How can you shut down the computer automatically, whether you have a Duo that has woken up for an online session, or you just have a PowerBook with a task to finish while you want to go somewhere else? You simply set your PowerBook to go to sleep after a delay; just make sure that none of the many functions that inhibit sleep (AppleTalk turned on, for example) are in effect.

PwrSwitcher 1.1.2, David Lamkins's free control panel, uses the escape key to switch between active applications, saving you a trip to a window or to the application icons in the menu bar.

SoftwareFPU 2.45, a $10 control panel from John Neil, enables a PowerBook without a floating-point unit to run software that expects one. The program improves software compatibility but does not speed up math computation. It does not run on 68000-based Macs such as the PowerBook 100, but it works with the new 040 PowerBooks.

The Duo has a split personality; it's both a lightweight portable and a desktop computer with a dock. The system configuration you need probably depends on whether you are using a Duo alone or with a dock. Alan Steremberg's free Duo Extension Picker 1.0 checks the hardware during start-up and loads the proper extensions, depending on how you're using the Duo. For users of multiple docks, Steve Martin's $15 Dockernaut 1.4.2 remembers the color-depth capability of each dock and sets the Duo accordingly. It also lets you create multiple preference files for several popular programs (including Microsoft Word) and then selects the appropriate preference file for your work situation: Duo alone, with a dock, or with a minidock. You can set Word, for example, to display its tool bar on large monitors and suppress the tool bar on the Duo's screen. Dockernaut requires an extension manager (Now Utilities or Conflict Catcher II) to selectively load extensions depending on which dock you use.

Software Sources

Most of the programs I've listed are shareware or freeware; you can get them from major online services, such as America Online and CompuServe, which tend to have the most up-to-date versions. Many are also available from user groups. Keyboard Plus, Caps Lock Notify, and Duo Extension Picker were not available from the commercial online services as I wrote this—I found them on the Internet at mac.archive.umich.edu. If you get your shareware on a CD-ROM, look for one that is updated frequently, such as the quarterly BMUG PD-ROM ($40) from BMUG (510/549-2684). Remember that paying for connect time or for a floppy disk or CD-ROM is not the same as paying the shareware fees.

More on SCSI Cabling

In last month's column on managing SCSI devices, I included a table ("Connecting Cables," page 164) that showed the most commonly used methods of connecting a PowerBook to a SCSI device and of connecting a PowerBook in SCSI disk mode to another Mac. However, one of the cables shown (labeled B in the table) is an unusual one—a DB-25 male to C-50 female cable ($8 from Computer Gate International, 408/730-0673). You can substitute instead a standard SCSI cable, DB-25 male to C-50 male, with a female-to-female C-50 gender changer. **m**

CARY LU is a *Macworld* contributing editor who covers mobile- and remote-computing issues in this monthly column. His books include *The Apple Macintosh Book* (Microsoft Press, 1992).



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MACWORLD Expo/Boston; August 2-5, 1994

MACWORLD Expo/Boston will cover over 350,000 square feet of exhibit space at both the World Trade Center and Bayside Exposition Center. When you come to MACWORLD Expo/Boston, you'll see uses and applications for the Macintosh in a variety of areas including: Networking, Spreadsheet Analysis, Databases, Education, Research, Word Processing, Accounting, Law, CAD/CAM, Forecasting, Design, Publishing, Illustration, Animation, Music, Programming, Entertainment and Multimedia. You'll see all this spread out over both locations so plan to be in Boston from August 2-5 and experience the Macintosh at its absolute best!

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THE CONFERENCE PROGRAM

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MACWORLD EXPO/BOSTON 1994 CELEBRATES THE 10TH ANNIVERSARY OF THE MAC'S DEBUT WITH A PANORAMA OF EMPOWERING OPPORTUNITIES AND POSSIBILITIES. FROM APPLE'S TECHNOLOGICAL BREAKTHROUGHS TO THE IMPACT OF DIGITAL CONVERGENCE, YOU'LL DISCOVER NEW DIMENSIONS TO THE MAC.

HERE'S A PREVIEW OF MACWORLD EXPO/BOSTON'S 14 SEPARATE CONFERENCE PROGRAMS. CREATE YOUR OWN AGENDA:

1 The PowerPC Conference.

EVERYTHING THERE IS TO KNOW ABOUT POWERPC — FOR USERS, VENDORS, AND DEVELOPERS — INCLUDING: WHAT POWERPC DELIVERS; APPLE'S IMPLEMENTATION VS. IBM'S; COMPATIBILITY; UPGRADING; WHEN/WHAT TO BUY; NATIVE VS. EMULATION; HOW COMPETITIVE IS POWER PC?; POWERPC DEVELOPMENT TOOLS; AND MORE.

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3 The Entertainment Conference.

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4 The Connectivity Conference.

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5 The Small Office/Home Office Conference.

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6 The Science/Technology Conference.

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7 The Programmer/Developer Conference.

FOR IN-HOUSE DEVELOPERS, VETERAN INDEPENDENTS, AND NOVICE MAC TECHIES ALIKE: THE NEW WORLD OF OPPORTUNITIES WITH NEWTON, POWERPC, OPENDOC, APPLESCRIPT — PLUS ULTIMATE MAC PROGRAMMING TIPS.

8 The Education Conference.

TEACHERS AT THE ELEMENTARY, SECONDARY, AND UNIVERSITY LEVELS SHARE SUCCESSFUL MAC EXPERIENCES WITH MULTIMEDIA, CD-ROM, HYPERCARD, QUICKTIME, BBSS, INTERNET — AND STUDENTS DEMO THEIR MOST OUTSTANDING MAC PROJECTS IN SCIENCE, MATH, SOCIAL STUDIES AND DESKTOP PUBLISHING.

9 The How-to-Get-Started Conference.

LEARN THE BASICS — OF NEWTON, DESKTOP PUBLISHING, MUSIC, INTERNET, TELECOMMUNICATIONS, DESIGN, MULTIMEDIA, QUICKTIME, AUTHORING, INTERACTIVITY, AND USING CD-ROM.

10 The Advanced User Conference.

VETERAN USERS SHARE THEIR EXPERTISE ON CUSTOMIZING YOUR MAC, RESOLVING SYSTEM CONFLICTS, MAXIMIZING FONTS, AND POWERIZING YOUR POWERBOOK.

11 The Special Interest Group Conference.

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12 Application Workshops.

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13 The Multimedia Conference.

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14 The CD-ROM Conference.

WANT TO PUBLISH AN ENTERTAINMENT OR CONSUMER CD? START WITH THE MAC. LEARN ABOUT PHOTO CD; KIOSKS; BUILDING SUCCESSFUL TITLES; DEVELOPING INTERACTIVE GAMES; CONTENT LICENSING; DOCUMENT CONVERSION AND MANAGEMENT; AND MARKETING YOUR CD.

MACWORLD EXPO/BOSTON

BAYSIDE EXPOSITION CENTER
& WORLD TRADE CENTER

EXHIBITION HOURS

AUGUST 2-4	10:00AM-6:00PM
AUGUST 5	10:00AM-4:00PM

CONFERENCE HOURS

AUGUST 2	10:30AM-5:30PM
AUGUST 3-4	11:30AM-5:30PM
AUGUST 5	11:30AM-2:30PM



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❑ **PACKAGE TWO $25.**
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❑ **CHECK IF APPLICABLE.**
I'M AN INTERNATIONAL ATTENDEE. PLEASE SHIP MY BADGE BY FEDERAL EXPRESS. ENCLOSED IS AN ADDITIONAL $45.

PLEASE CHOOSE YOUR PACKAGE AND FILL OUT THE FORM COMPLETELY. INCOMPLETE FORMS WILL BE RETURNED. ONE FORM PER PERSON; MAKE PHOTOCOPIES FOR ADDITIONAL PEOPLE. PLEASE DO NOT STAPLE CHECK TO FORM. REGISTRATION FORMS RECEIVED AFTER JUNE 24, WILL BE RETURNED UNPROCESSED. PURCHASE ORDERS CANNOT BE ACCEPTED. ALL REGISTRATION FEES ARE NONREFUNDABLE. A $20 FEE WILL BE CHARGED FOR ALL RETURNED CHECKS. SEND COMPLETED FORMS TO:

MACWORLD EXPO/BOSTON
P.O. BOX 4010
DEDHAM, MA 02027

U.S BADGES: MAILED AROUND JULY 18.

INTERNATIONAL BADGES: HELD ON-SITE.

BADGE PICKUP HOURS ARE:
AUG. 1, 11AM - 3PM; AUG. 2-4, 9AM - 6PM; AUG. 5, 9AM-4PM

PLEASE SEND MY REGISTRATION BADGE AND FURTHER INFORMATION TO:

PLEASE CHECK ONE: ❑ HOME ADDRESS ❑ COMPANY ADDRESS

FIRST NAME ___/___/___/

ATTENDING MADE EASY

MACWORLD Expo/Boston 1994, Bayside Exposition Center, 200 Mount Vernon Street and World Trade Center, 164 Northern Avenue.

Tuesday, August 2 – Thursday, August 4, 10:00 a.m. - 6:00 p.m. and Friday, August 5, 10:00 a.m. - 4:00 p.m.

U.S. Attendees.

Badges will be mailed on or about July 18. Be sure to check box indicating where badge should be sent.

International Attendees.

International badges (including Canadian) will be held for pick-up at the International Preregistration counter at Bayside Expo Center. For Federal Express service, check the appropriate box below and add $45 to your preregistration fee. Fill in your exact street address (no P.O. boxes) and include your telephone number and country code. We will Federal Express your badge directly to you. Badge Pickup hours are: Aug. 1, 11am - 3pm; Aug. 2-4, 9am - 6pm; Aug. 5, 9am-4pm

Fly American Airlines and Save.

Enjoy savings on applicable fares when you fly American Airlines, the official airline of MACWORLD Expo. American is offering attendees discounts of 5-10% on most fares. Dial 800-433-1790 to speak with an American Airlines reservationist and reference Star File #SO174AL. Savings are available on applicable fares only.

Car Rental Discounts From Alamo.

Alamo Rent a Car has been appointed the official car rental company for MACWORLD Expo/Boston, and special discounted rates have been extended to attendees. These rates are available one week before and after the meeting dates and include unlimited free mileage. To make reservations call Alamo at 1-800-732-3232 and request group I.D. #378360 and rate code GR. Advance reservations are required.

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Hotel Accommodations

Participating hotels in the Boston area are offering MACWORLD Expo discounts. To receive the preferred rate, call one of the hotels listed below and mention you'll be attending MACWORLD Expo. There are a limited number of rooms available and they sell-out quickly. Make your reservations by June 20 for the best selections. Prices reflect single and double occupancy. If you are reserving 10 or more rooms, you must supply the hotel with a rooming list and a non-refundable deposit for the first night, no later than June 20.

Services for the Physically Challenged.

We're committed to ensuring that our physically challenged attendees receive all the services they need to make their show visit enjoyable. Call us at 800-945-3313 for details.

Pre-recorded Information.

For pre-recorded information about MACWORLD Expo/Boston, call the MACWORLD Expo Information Hotline at 617-361-3941. 24-hours per day, seven days a week.

Early Bird Registration.

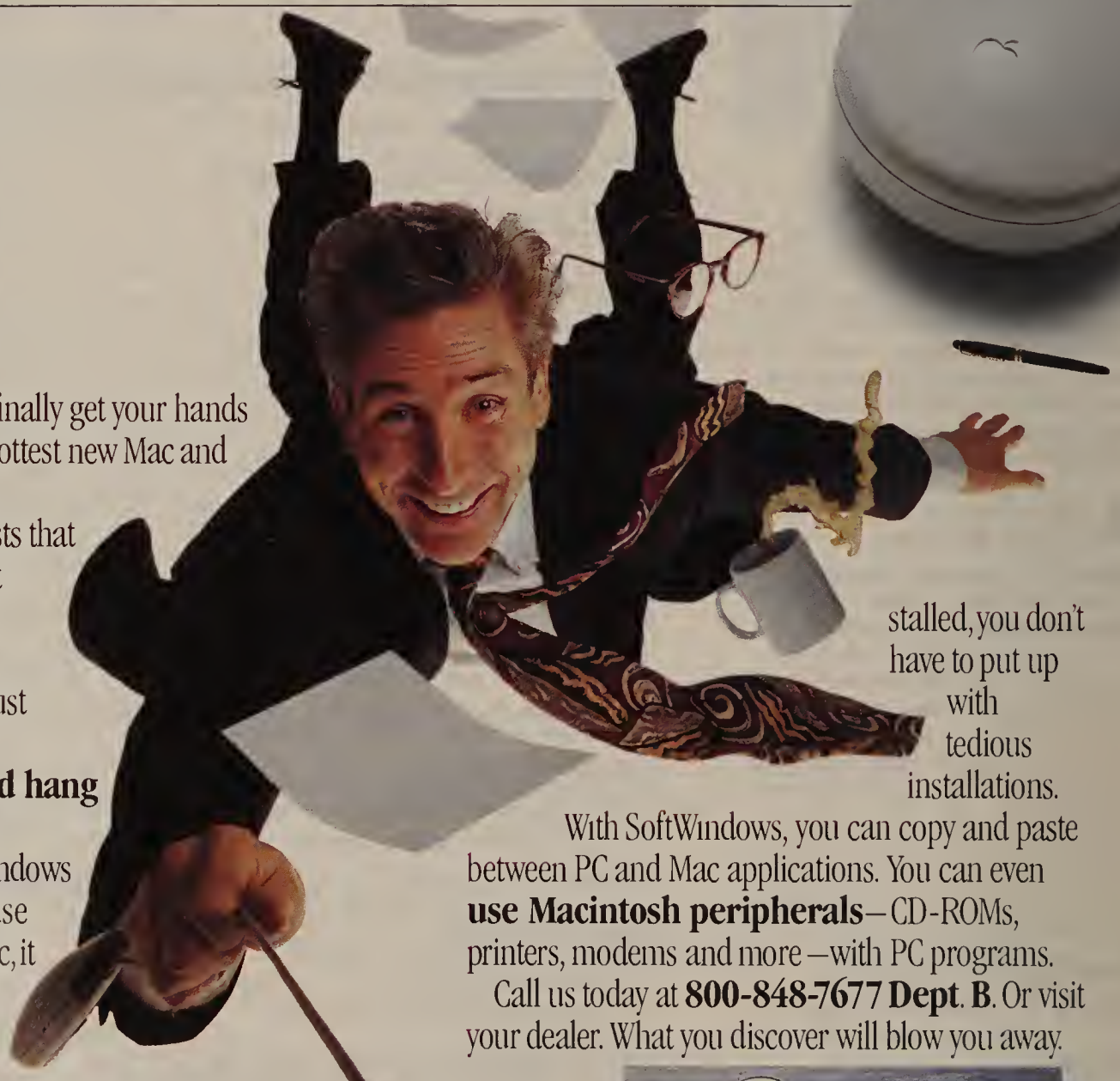
Missed the pre-registration date? You can still register before the start of the show! On-site Early Bird Registration is from 11:00 a.m. - 3:00 p.m. on August 1 at the full registration rates of $150 for all Conference Sessions and Exhibits, and $40 (cash only at the door) for Exhibits-only admission.

MACWORLD EXPOSITION

Hotel	Shuttle	Single/Double	Telephone
57 Park Plaza 200 Stuart St., Boston, MA 02116	B/C	$115/$125	(617) 482-1800
Back Bay Hilton 40 Dalton St., Boston, MA 02115	C	$150/$170	(617) 236-1100
Boston Marriott Copley 110 Huntington Ave., Boston, MA 02116	C	$179/$179	(617) 236-5800
Boston Marriott Long Wharf 296 State St., Boston, MA 02109		$230/$250	(617) 227-0800
Boston Park Plaza 64 Arlington St., Boston, MA 02116	B/C	$131/$151	(617) 426-2000
Colonnade Hotel 120 Huntington Ave., Boston, MA 02116	C	$170/$190	(617) 424-7000
Copley Plaza 138 St. James Ave., Boston, MA 02116	C	$179/$199	(617) 267-5300
Four Seasons 200 Boylston St., Boston, MA 02116	B/C	$242/$264	(617) 338-4400
Guest Quarters Hotel 400 Soldiers Field Rd., Boston, MA 02134	H	$155/$165	(617) 783-0090
Harborside Hyatt 101 Harborside Dr., Boston, MA 02128	H	$175/$195	(617) 568-1234
Hilton at Dedham Place 95 Dedham Place, Dedham, MA 02026	H	$125/$125	(617) 329-7900
Holiday Inn Government Center 5 Blossom St., Boston, MA 02114	B	$149/$165	(617) 742-7630
Hyatt Regency Cambridge 575 Memorial Drive, Cambridge, MA 02139	H	$165/$185	(617) 492-1234
Le Meridien Hotel 250 Franklin St., Boston, MA 02110	B	$210/$210	(617) 451-1900
Lenox Hotel 710 Boylston St., Boston, MA 02116	C	$150/$170	(617) 536-5300
Logan Airport Hilton Logan International Airport, E. Boston, MA 02128		$140/$160	(617) 569-9300
Omni Parker House 60 School St., Boston, MA 02108	B	$145/$165	(617) 227-8600
Ritz-Carlton Hotel 15 Arlington St., Boston, MA 02117	B/C	$210/$220	(617) 536-5700
Royal Sonesta 5 Cambridge Pkwy, Cambridge, MA 02142		$145/$145	(617) 491-3600
Sheraton Boston Hotel & Towers 39 Dalton St., Boston, MA 02199	C	$155/$170	(617) 236-2000
Sheraton Tara Braintree 37 Forbes Rd., Braintree, MA 02184	H	$119/$119	(617) 848-0600
South Bay Hotel *(Formerly Howard Johnson's)* 5 Howard Johnson Pl., Boston, MA 02125	H	$80/$90	(617) 288-3030
Swissotel One Ave. de Lafayette, Boston, MA 02111	B	$159/$169	(617) 451-2600
Tremont House 275 Tremont St., Boston, MA 02116	B	$110/$125	(617) 426-1400
Westin Copley 10 Huntington Ave., Boston, MA 02116	C	$185/$205	(617) 262-9600

*Legend: (B) Hotel is within walking distance of Boston Common shuttle location.
(C) Hotel is within walking distance of Copley Square shuttle location.
(H) Hotel is providing its own shuttle to MACWORLD Expo.

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BY DAVID POGUE

Skinflint Software

Cheapie shareware substitutes for pricey programs

THE WRIGHT BROTHERS BUILT their baby biplane using borrowed bicycle bolts. Mary Jacobs, inventor of the brassiere, manufactured her initial inventory out of handkerchiefs and ribbon. Apple Computer began as a couple of guys in a garage. In fact, with the possible exceptions of Claris Corporation and Paul Newman's food company, just about every famous business alive today had to scramble through its first lean, makeshift years.

Nowadays, of course, "roughing it" entails different sorts of sacrifices. You endure curly fax paper instead of plain paper. You schedule FedEx packages for *afternoon* delivery. And maybe—just maybe—you use shareware instead of the high-priced commercial stuff.

Shareware is try-before-you-buy software. If a program strikes your fancy, the International Honor System compels you to mail a check directly to the programmer. Why get involved with such an unregulated, underground market? Because the price of a commercial program covers such frills as packaging, advertising, tech support, and taxes. A shareware programmer's most crippling costs, on the other hand, are Van Halen tapes and pizza. As a result, you pay only $15 or $30 for the end product.

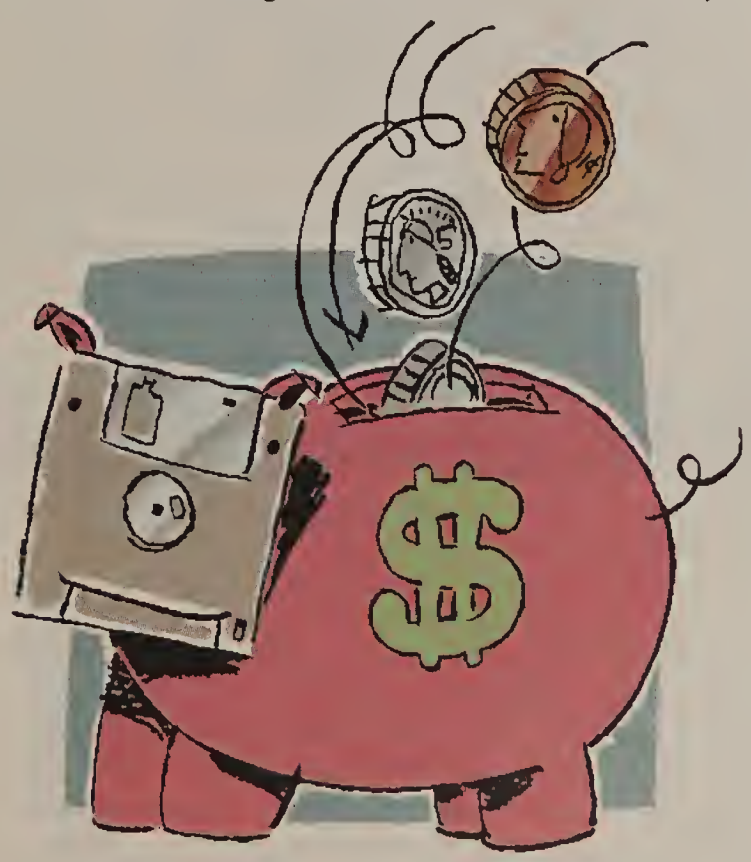
This year's annual *Desktop Critic* shareware roundup features programs that are obviously modeled on big, expensive business software. Shareware programs are not generally *better* than the commercial alternatives, but in many cases they're similar—and they're always cheaper. (If you have a modem, you can get this stuff from, for example, the Macworld Online area of America Online. If you have no modem, use the contact info provided herein.)

PowerBar 1.1.1

The Mac's halls of history are littered with attempts to out-Finder the Finder—to iconize the icons. We've seen Tiles, At Ease, the Performa's Launcher, Applicon, and Square One, the most versatile and successful of all.

PowerBar is Square One with a twist. It's a resizable, reshapable bank of icon tiles (see "Hanging Out in the Bar"). You install your favorite icons—files, folders, programs, desk accessories, aliases, control panels, and the like—on the tiles. Once you're in PowerBar, you can open an icon with one idiot-proof click of the mouse. PowerBar's ease-of-use masterstroke: you install, rearrange, and move the palette icons by simply dragging them around.

PowerBar's list of secondary features would fill a CD-ROM. You get a floating status bar showing gauges for memory, disk space, and (for PowerBooks) battery juice; instant creation or repair of aliases; a nifty window-management option (autohide when you switch programs, for instance); and single-click tiles that re-



start, shut down, empty the Trash, put selected icons into the Trash, and so on. My personal favorite: you can install tiles that, when clicked, execute the QuicKeys macros of your choice.

That last feature is, again, shades of Square One ($74); but as Apple might say, PowerBar does more and costs less ($25). Yes, I wish PowerBar would not hide its icons' names; and yes, I wish it didn't conflict with PopupFolder. But it's staying on my screen anyway. (Scott Johnson, 2812H Macintosh Ln. [really!], Maineville, OH 45039.)

Town Meeting 2.0

When you drive onto the information superhighway, the Mac screen is your windshield, and you carry no passengers. In the age of anonymous online encounters, doesn't anybody worry about the loss of face-to-face human contact?

Certainly not *Fortune* magazine, which recently extolled the virtues of electronic-meeting software. Nor IBM, which sells just such a program for $50,000. Nor Adam Stein, who wrote a shareware version.

With Town Meeting, you and the other meeting participants remain comfortably at your desks. Everyone communicates by typing. As the discussion goes on, the comments scroll up your screen like a movie script, much as in the chat rooms of America Online. It's fast, it's simple, and it forces participants to be concise. According to *Fortune*, it also encourages shy people to speak up. And—because you can choose to be anonymous—it lets participants toss out risky ideas without fear of ridicule or subsequent snubbing at the watercooler.

OK, maybe the future won't be so bad—as long as we get up once a month to wander around the office and remember what everyone looks like. (Adam Stein, 303/872-8651; $24.98; 5-, 10-, and 20-user packs available from $112.98 and up. Prices will double in 1995.)

Do It All 3.020

This scheduling/reminder/to-do–list manager is gorgeous, fast, and simple to use. You can note a scheduled appointment by dragging through a vertical time line, exactly as you can in Now Up-to-Date and its rivals. (You cannot, how-

continues



Hanging Out in the Bar PowerBar is a launching pad not only for icons, but also for Mac functions such as Empty Trash, Restart, and Hide Other Applications.

ever, reschedule an appointment by dragging its description.)

One brilliant exclusive feature: you can assign priority levels to a to-do–list item that increase over time. For example, today I might assign a priority level of 4 to "Eat leftover ziti in fridge." But two weeks hence, as the ziti completes its gradual disintegration, Do It All begins waving that message wildly at the top of the list, with an urgency level of 9.

There's also an Appointment option I wish every similar program had: you don't have to painstakingly type in a start and end time for every appointment. Instead, you can click on an Anytime check box, as you'd do for such day-oriented reminders as "Jennifer's birthday," "Vote today!," and "Throw out ziti."

Other Do It All features include alarms; one-step, recurrent-event programming; and online help. (J. Christopher Bell, 1830 Austin Ave., Los Altos, CA 94024; $40 per business, or $15 to $35 for individuals.)

Idealiner 3.4

What ever happened to outlining programs, anyway? Remember Acta? ThinkTank? More? In the late 1980s, they and Madonna were all anybody talked about.

Those programs may have faded from prominence, but the concept of outliners is still golden. Any structured piece of writing or speaking is easier to create if you put its skeleton together first and add the flesh later.

Idealiner is a relic; its last update was in 1990. But it offers many of the same features as the pricier dinosaurs: you can "collapse" subpoints to view only your main headings; you can rearrange, promote, and demote headings from the keyboard; and you can double-click on any heading or subheading to open a text window in which to write the body of your speech, thesis, or article.

Ultimately, though, Idealiner's generous import and export options are its best feature. The program allows you to save any portion of your outline as a correctly numbered and indented MacWrite or text file—which, of course, you can then open with any word processor alive. Perhaps the only feature that users of More will miss is the ability to set up different fonts for each level of heading. (Free; Clifford Story; currently available only online, as far as I know.)

Mariner 2.16

There was this witty Microsoft ad that said something like, "99 out of 100 spreadsheet owners use Excel. What are we doing wrong?"

If you're willing to be one of the rebel 1 percent, you can save mucho moolah. Mariner looks and works exactly like Excel: it comes with 75 functions, 9 graph types, 3-D worksheets, split panes, individual cell fonts, resizable column widths and heights, a floating tool bar, named cell references—the works. And you can export your spreadsheet (sans graphs) to Excel. It's so complete that the Read Me file's apologetic note stating "[Mariner] does not yet support color, 3-D charts, macros, or an external command language" is almost comically forgivable.

In fact, it could be argued that for plain-vanilla number crunching, Mariner is actually superior to Excel. Mariner runs in 763K of memory (Excel uses 2048K) and requires 236K of disk space (Excel takes up 1885K, without support files). Mariner costs $40 (Excel is street-priced at $300). And Mariner has nine levels of Undo (Excel has one). Snap this program up before it goes commercial later this year. (William Paar, 1903 FoxTrain Dr., LaGrange, KY 40031.)

Two Nifty Telephone Utilities

Some programs I describe here are indeed Davids battling the Goliaths of commercial software. But others fulfill a more traditional shareware function: they fill a tiny niche. AreaCodeFinder 3.1.0 is a great example of this. It's a stylish and sleek one-trick pony that looks up a city if you know the area code—or vice versa. It's got 2400 cities in its little brain, and you can add your own. It even blinks your target city's location on a U.S. map, so you can check the time zone and avoid waking your mother at an ungodly hour. (John J. Calande III, 619 S. Clifton St., Philadelphia, PA 19147; $8.)

Talk about nichey. The puny program called 800-SAY-WHAT is on a miniature mission from God: to translate those mnemonic but irritating-to-dial 800 numbers, like 800-SOS-APPL or 800-CAR-RENT, into normal numbers. Crude but fast. (William Modesitt, 2620 Baldwin Ave., #204, Makawao, Maui, HI 96768; $5.)

Sample Editor 1.0.3

For years, Apple has waffled on its dedication to the Mac as a tape recorder. Exhibit A: its on-again, off-again practice of including a microphone with each computer. (At the moment, it's off again.)

If everybody knew all about Sample Editor, things might be different. This shareware program gives your Mac a visually stunning sound-editing interface, much like the high-priced $295 SoundEdit Pro from Macromedia. As long as you have System 7, a color monitor, and not too many extensions, you can enjoy Garrick McFarlane's polished piece of powerware.

Using Sample Editor, you can cut, copy, and paste snippets of sounds you have recorded; touch them up with crossfades, reverb, and other effects; play them backward; speed them up or slow them down; raise James Earl Jones's voice to the pitch of Cyndi Lauper's; zoom in and study the actual waveform of a sound; and so on. And what does the kindly Englishman want in exchange for this software studio? "E-mail or a small cash donation," he says. Think you can manage that? (Garrick McFarlane; available only online.)

The Upshot

This is not your father's shareware. No longer should you think of shareware as the domain of first-time BASIC programmers and game junkies. Much of today's shareware is solid, polished stuff, featuring slick 3-D interfaces, balloon help, and quick performance.

Ironically, as shareware becomes more sophisticated, the commercial software deal is simultaneously getting *worse.* Used to be that you'd buy a commercial package because of the support it offered (phone help and all that). But today, you might wait on hold for 30 long-distance minutes. And, in a trend perpetuated recently by Microsoft, Claris, Quark, and many other companies, you might have to *pay extra* for the privilege of phone support—as much as $25 per call. A shareware author, on the other hand, is likely to respond to your frantic E-mail within a day. For free.

Do you, too, find the pay-for-support trend revolting? Download some shareware, send in a few dollars, and start doing a little revolting of your own. **m**

Contributing editor DAVID POGUE is the author of IDG Books Worldwide's *Macs for Dummies, More Macs for Dummies, Le Mac Pour Les Nuls, Macs für ~~Dummie~~ Anfänger, Usare il Macintosh Senza Fatica, Macintosh Para Leigos, Mac for Dosmere,* and the Japanese title, which this font doesn't have the right symbols for.

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Circle 49 on reader service card



BY STEVEN LEVY

Optimism about the Net

And now, the good news on hitting 100

THE ANNUAL COMPUTERS, FREEDOM, and Privacy conference is a gathering of the best and brightest observers, critics, and hands-on pioneers of the digital frontier. Shared among them is a belief that computers, particularly those linked by networks, should contribute to public well-being and not be party to an abrogation of our privacy or our rights. The topics are stimulating and the informal conversations provocative. But I left Chicago, the site of this year's convocation, somewhat depressed. Once again, the focus of the event was a negative one—fighting the so-called Clipper chip, a scheme concocted by the National Security Agency (NSA) that would rob us of the ability to keep our phone calls and E-mail messages hidden from government eyes.

The Clinton administration has endorsed the Clipper, which attempts to set a strange sort of cryptographic standard wherein the government guarantees itself a key to unlock otherwise private conversations. A year ago I covered the odious Digital Telephony bill—an initiative requiring that the entire communications structure of the nation be "dumbed down" to give the government continued ease in wiretapping our phones and reading our faxes. With the Clipper, the Clinton-Gore team has endorsed an even more repressive version of the proposed legislation.

So I suppose I should sound the alarm again and urge you to write your congressional representatives (cc'ing your letters to Senator Patrick Leahy and Representative Don Edwards, who are holding subcommittee hearings on these matters). And for good measure, I should also suggest that you drop a note to your legislators urging them to support the Cantwell bill, which seeks to liberate cryptography from its current status as a munitions item subject to draconian export regulations. But as I sat among the CFP attendees, listening to the general counsel of the NSA trill the virtues of the Clipper, I found myself surprisingly optimistic.

Sunny-Side Up

This issue marks my 100th column for *Macworld*. (Reminder to self: send picture to Willard Scott!) My first column, in April 1986, was an attack on Lotus Jazz. Through the years, I've compiled a record of peevish assessments: The Macintosh Portable. The original StyleWriter. John Sculley's ego. I really hadn't noticed how dour was my demeanor until the day when software developer Dave Winer asked me in total seriousness, When was the last time I *liked* something? (And this was before my not overly favorable review of Winer's product Frontier.)

His point was well taken. Though I am cynical by nature, I am a lover of good technology. So as I reach the century mark, it's appropriate to devote this



space to a phenomenon I thought about as I listened, spoke, and networked at CFP—the key development in the computer world since I began addressing my readers as The Iconoclast eight-plus years ago, and one that makes me uncharacteristically upbeat.

I am referring to the best imaginable consequence of easy-to-use, powerful computers: the emergence of an electronically linked global community. The greatest human work-in-progress these days is the variegated edifice of connections called cyberspace. But some people, including some speakers at the CFP conference, worry that the very popularity of the Internet may be its undoing. Millions of people are arriving as new members of services such as America Online and CompuServe; more will be attracted by newer nets such as Apple's forthcoming eWorld. Increasing numbers of these newcomers are finding their way onto the daddy of all nets, the Internet. Whereas computer networks to date have been relatively civilized arenas, this historic digital immigration threatens to make things downright unfriendly. Call it the urbanization of cyberspace. Will the influx erode the convivial culture?

I don't think so. In fact, I anticipate the opposite—that the open, exploration-friendly nature of the Net is more likely to change the newcomers than the other way around. That prospect is delicious.

Lessons of History

To help you understand why, let me give you a brief history of cyberspace. It began with a government project called the ARPANet, a network that allowed a group of computer-science–oriented universities and institutions to exchange files and notes among themselves. Its designers were quickly astonished by an unexpected phenonemon—users took advantage of its efficient communications facilities to establish informal yet deep communication of a *human* nature. The ARPANet became a cultural transmitter of sharing-oriented values, particularly those of MIT's Artificial Intelligence lab. As the network grew to many more sites from 1969 to 1989, it preserved the best of MIT's hacker culture and really became the focus of computer culture in general.

In the late 1970s, an important tributary to that culture opened: a decentral-

continues



ized archipelago of privately operated, no-cost bulletin board systems. These were typically set up by people whose main goal was establishing a free flow of information and software. So by the time the first commercial systems, including The Source and CompuServe, opened in the 1980s, the tone of cyberspace was set. Those commercial nets that ignored the protocols of open communications and free exchange (for example, the first iteration of Prodigy) did so at some risk.

In the 1990s, the character of the Net—from conferencing systems such as The WELL in the San Francisco Bay Area and Echo in New York City, to America Online, to the Internet itself—has become well established. While the verbiage can get pretty heated in cyberspace, there is a solid focus on the free exchange of information. This is best exemplified by the fact that one can cruise through various networks picking up valuable shareware, freeware, and priceless nuggets of information for little or no cost. And when someone posts a request for help on CompuServe or a Usenet group, the normal response is a flood of assistance from altruistic users.

Despite the invasion by hordes of outsiders and tourists, I think this spirit will continue.

Items on the Menu

Is my optimism unjustified? I don't think so. Consider a fascinating article by Natalie Glance and Bernardo Huberman of Xerox PARC that appeared in the March issue of *Scientific American*. The subject was the various behavioral possibilities in the so-called Unscrupulous Diner's Situation. This occurs when a group of people decide in advance to split a restaurant check evenly. This presents each individual with a dilemma: Should you order lobster and Dom Perignon, knowing that the high cost will be amortized among several diners? Or should you order chicken and a house wine to keep costs down? The optimal solution seems to be for everyone to order moderately; then the bill for all will be low.

Remarkably, the Xerox PARC researchers found that in both human studies and computer simulations, cooperation works. The biggest threat to cooperation is the fear that some freeloader (known as a "defector") will eat high on the hog, while you with your peanut-butter sandwich wind up paying for the louse. This makes you a "sucker," and no one wants to be a sucker. But in most cases, especially when there is reason to believe that the group will dine together again, people take the hopeful step of ordering reasonably—as long as they have even a slight indication that their fellow diners will also do so.

This hypothetical situation seems to exist for real on the global network. Cooperative behavior in cyberspace is firmly established; in fact, so many people donate their time and product for little or no money that the sucker factor has been virtually eliminated. Potential defectors—those who would greedily scoop up (or screw up) the efforts of others while failing to contribute themselves—have to violate the communal spirit very consciously. Can they do that? Sure. But then those defectors forfeit one of the main benefits of the Net—the sense of connectedness that comes from participating in such a unique cooperative effort. I think this factor will ensure that the Net's openness will remain self-sustaining.

There are other factors, too. Did you ever notice what happens when someone posts a nasty flame on a conferencing system, something really out of line? While it sometimes evokes a like response, more often than not observers step in and warn the offending flamer that he or she should back off. (And almost always, the original ranter posts an apology for the rash message.) Likewise, a particularly astute commentary commonly draws a series of digital pats on the back ("Great stuff, Roger!"). Good citizens of the Net act as a sort of antibody, rising from the data muck to cluster around an invader and limit the damage. And if you view the Net as an organism, you'll see all kinds of ways that its immune system resists bad-attitude postings from newcomers and malcontents. For instance, to squelch the most virulent flamers, some people have designed "bozo filters" to allow users to literally tune out those who simply aren't worth listening to.

Bigger than All of Us

I'm not saying that everything is sweetness and light on the Net, or that digital vandals and just plain selfish people won't perturb the rhythms of cyberspace. But the Net will handle it. The Net, really, is a stable system that's bigger than all of us and has ways of maintaining its positive equilibrium. And that is what makes it so exciting—I can't really think of an antecedent for the Net. Despite the unpleasant distractions of the Clipper chip and Digital Telephony, we're breaking new ground here. And there's no telling where this momentum will take us. m

STEVEN LEVY's latest book is *Insanely Great: The Life and Times of Macintosh, the Computer That Changed Everything* (Viking, 1994).



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BY DEBORAH BRANSCUM

Great Mac Resources

Get more from your computer with these useful tools

THE TIME HAS COME FOR THE fifth annual roundup of terrific Mac resources. Once a year I like to share information on services, publications, and software that aid and abet computing. Some are specifically aimed at Mac owners; others cover broader territory but are still interesting. This year's crop includes a publication for ClarisWorks users, news services that bring the latest to your desktop, and books that help you stay healthy.

ClarisWorks in Detail

ClarisWorks users have a friend in *ClarisWorks Journal*, an unusually helpful publication from the ClarisWorks Users Group of Plymouth, Michigan (313/454-1969, fax 313/454-1965). This 24-page newsletter, published ten times a year, offers clear, specific tips on using this best-selling application. The February and March issues are packed with great information, including a database primer on using dates in calculations; spreadsheet tips; a section for teachers on creating reports and tests with ClarisWorks; and an article written by Robert Duvall, author of the charting module in ClarisWorks, on how to use the program's undocumented charting features.

CWUG also offers monthly disks of shareware fonts, graphics, and ClarisWorks templates. Shareware disks ($8 each) and a public-domain catalog ($5) are available to nonmembers. CWUG's 10,000-plus members worldwide don't meet, but they do get benefits such as a training-tape rental service and an active BBS (615/359-8238). One big advantage for members outside the U.S. is that they can order software products through CWUG, giving them access to U.S. programs at U.S. prices. *Macworld* readers in the U.S. can join for $29 annually; memberships outside North America are $48 annually ($71 for airmail).

Troubleshooting Tips

There are many good books on troubleshooting, and I cited several in last July's column. One I didn't cover then, but that's worth noting, is *Desperately Seeking Solutions: A Troubleshooting Guide to the Mac* (Hayden Books, 1993). Author Erica Kerwien, a tech-support maven, explains problems and solutions in clear, helpful prose. An especially useful feature is a list of questions covered in each chapter and where to find the answer ("Why can't I delete this file? page 117," for example). The $29.95 tome also includes a shareware disk with Disinfectant, SCSIProbe, TattleTale, Systems Errors DA, and System Picker.

News on Your Desktop

Individual, Inc., of Cambridge, Massachusetts (617/354-2230, 800/414-1000), offers two news services for tracking computer-industry developments (or anything else) right from your desktop. HeadsUp and First are news services geared toward individual and corporate users, respectively; they draw from some 300 information sources for daily, personalized news reports. The sources include 79 national newspapers (including the Knight-Ridder chain); several Canadian papers; and trade publications and wire services pertaining to business, law, finance, and health.



HeadsUp costs $29.95 per month for electronic delivery of 20 daily news briefs and one full-text article each business day. (A one-year subscription of daily briefs and 160 full-text articles costs $695.) The briefs are short synopses of articles that focus on 5 to 10 topics selected by a customer from a list of more than 700 (there is some overlap among topics). The areas covered include computer hardware and software, information services, data communications, energy, health care, semiconductors, telecommunications, and transportation. An additional full-text copy of any article is available for $4.95. HeadsUp users call a toll-free number to order the full article, which should arrive within 30 minutes of placing the order. Best of all, Individual offers a free, 30-day trial subscription to HeadsUp, so it's painless to check out the service.

First is designed for corporations and workgroups and should be useful for business folks who need to closely follow specific industry developments. Unlike Heads-Up customers, who select topics from a predetermined list, First customers can choose custom topics for their daily news. I used it, for example, to track PowerPC-related announcements. Subscription rates vary, depending on the type of service; an annual subscription fee of $6250, for instance, allows up to ten users to receive and share as many as 1250 articles via electronic mail (or via fax or Lotus Notes for different charges). First offers a brief trial service, as well as a three-month subscription.

A Guide to the Internet

A couple of years ago there were virtually no books about the Internet; now we have about a gazillion. Navigating the Internet to find the information you want can be difficult; *The Internet Yellow Pages* (Osborne/McGraw-Hill, 1994) makes this task much easier. This $27.95, 400-plus–page tome is organized alphabetical-

continues

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ly, lists hundreds of Internet information sources by topic, and includes a master list of Usenet newsgroups.

The list is useful, but it's the pithy descriptions of the discussion areas—from agriculture to zoology—that make the *Yellow Pages* fun to read. It of course lists where to find the Macintosh discussions; but it also includes, for example, this must-know reference for Usenet's rec.arts.sf.tv newsgroup: "It's natural to feel like you can never get enough science fiction. Your mouth goes dry, your hands press continually on the remote control even though you know it will not make science fiction magically appear before you. You need a source or you are going to lose your mind. When you can't find it on the tube, seek your sci-fi television support group and get a quick fix."

Healthy Computing

Tips on using applications are helpful, but so are tips and tricks for safe computing Two new books offer just such advice.

ZAP! How your computer can hurt you—and what you can do about it (Peachpit Press, 1994) offers an overview of health issues that may affect computer users, including eyestrain, physical injuries, and monitor emissions. Author Don Sellers takes a sane approach to sometimes emotional issues. The book's abbreviated coverage means that much gets left out. But that's OK—this useful, friendly volume ($12.95) points readers to additional sources of information. (Peachpit is selling 77,000 copies of *Zap!* at cost to U.S. corporations until September 5. The minimum order is 30 books; call Hannah Onstad for details at 510/548-4393 or 800/283-9444.)

A book dedicated to helping prevent computer-related physical injuries is *Repetitive Strain Injury: A Computer User's Guide* (John Wiley & Sons, 1994). This $14.95 volume was written by physician Emil Pascarelli and Deborah Quilter, a writer who has experienced RSI (also known as cumulative trauma disorder). They suggest a seven-point program for treating and preventing injuries, offer advice on choosing a doctor, and list support groups and organizations that may be helpful. If you're in pain from using your computer, this book may help you understand why (you should consult your doctor before following its advice). The authors warmed my consumer-advocate heart with this prose: "Don't be a sucker. Don't buy keyboards . . . or gimmicky devices or accessories unless you are positive they are worth the cost—and preferably have been evaluated by a competent doctor or occupational therapist."

CD-ROM Madness

A La Jolla, California–based company is producing a fascinating, maddening exploration into CD-ROM publishing called think[an interactive]. Adhoc Technologies (619/551-0109) and editor-in-chief Aaron Singer describe think as a mainstream, interactive, multimedia magazine. It has many beautiful screens, and several so-called interactive sections are compelling or amusing. But the information in the premier issue is thin. The review section, for example, covers two record albums, the 1941 film *Citizen Kane*, and a book. The review of Larry McMurtry's book *Streets of Laredo* begins, "I wish I had something profound to say about *Streets of Laredo.*" Me too. The opening "Reviews" screen is lovely, but it promises more than the content delivers. And I don't know whom to blame: the reviews have no bylines. Multimedia fans should still check out think—it's no threat to print media, but it's fun to explore.

Speaking of fun, last year I mentioned Owen W. Linzmayer's Cruel Mac Tricks. The disk grew into a book (with disk) called *The Macintosh Joker* (Hayden Books, 1993), which is equally useless to society and includes 11 new tricks. If you have an annoying sense of humor, this is the book for you. **m**

SERVICE HERO

Carolyn McLean of Buffalo was rescued recently by Dayna Communications. As a new employee at the State University of New York, she was confronted with two mysteriously nonfunctioning and possibly unregistered EtherPrint EtherTalk-to-LocalTalk converters. "Because I needed a fast solution in a public Mac lab on campus, I called Dayna on a Thursday to inquire about purchasing replacement boxes," writes McLean. Dayna's Derrick Hisatake told her the converters were covered by a lifetime warranty and shipped her new replacement converters that day. By Monday, the student lab was back in business. "I received excellent service from an extremely helpful employee."

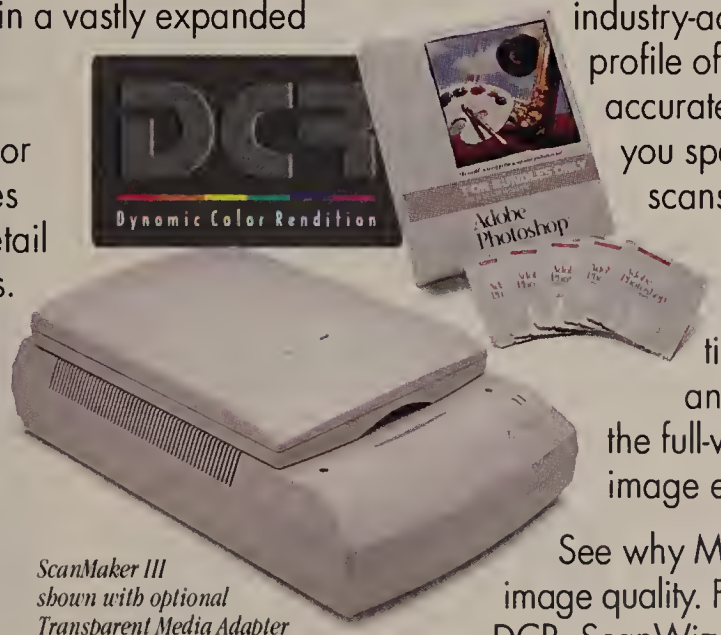
Send nominees for sainthood to *Service Heroes, Macworld,* 501 Second St., San Francisco, CA 94107, or via Internet (Branscum@AOL.com). Conversely, drop *Conspicuous Consumer* a line if a company is ignoring you.

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Editors' Choice

THE BEST PRODUCTS FEATURED IN MACWORLD

Edited by Susan Grant-Marsh

Macworld Editors' Choice is a complete listing of the hardware and software products selected as the best of their type in *Macworld*'s comparative articles. A ✣ next to a product indicates that we chose more than one product in that category. A ◀ next to a product listing indicates that a native Power Mac version is available.

Hardware

MONITORS

BLACK-AND-WHITE MONITORS, May 93
Portrait monitor: 15-Inch Gray Scale Portrait Display; Mirror Technologies, 612/633-4450; $399, with video-display board $549.
Two-page monitor: ✣ L-View MultiMode; Sigma Designs, 510/770-0100; $1099, with video-display board $1398. ✣ MD 202 Two Page Display; Mobius Technologies, 510/654-0556; $699, with video-display board $798.

COLOR MONITORS, Oct 93
16- and 17-inch: ✣ ErgoView 17; Sigma Designs, 510/770-0100; $1349. ✣ MultiSync 5FG; NEC Technologies, 708/860-9500; $1355 (NEC's estimated dealer price).

SMALL COLOR MONITORS, Jan 94
14-inch display: ✣ Sony CPD 1430; Sony Corp. of America, 800/222-7669; $779.95. ✣ Nanao FlexScan F340i•W; Nanao USA, 800/800-5202; $799.
15-inch display: NEC MultiSync 4FGe; NEC Technologies, 708/860-9500; estimated street price $755.

NETWORK HARDWARE

HARDWARE ROUTERS, Jul 93
Under $1500: EtherRoute; Compatible Systems, 303/444-9532; base model $1495 (no TCP/IP support).
Between $1500 and $3500: InterRoute/5; Farallon Computing, 510/814-5000; $3299 to $3499.

HIGH-SPEED FAX MODEMS, Oct 93
Teleport Gold and Silver with Global Fax; Global Village Communication, 415/390-8200; Gold $499, Silver $429.

POWERBOOK TOOLS

DUO DOCKING CONNECTORS, Feb 93
PowerLink DeskNet; E-Machines, 503/646-6699; $699.

EXTERNAL HARD DRIVES, Feb 93
✣ Companion 120; APS Technologies, 800/874-1428; $599. ✣ PocketDrive 120MB; La Cie, 503/520-9000; $699.

INTERNAL FAX MODEMS, Feb 93
✣ PowerModem series; PSI, 408/559-8544; $195 to $495. ✣ PowerPort series; Global Village Communication, 415/390-8200; $229 to $499.

PRINTERS

DYE-SUBLIMATION PRINTERS, Jul 94
Prepress proofing—tabloid size/fastest: Phaser 480; Tektronix, 503/682-7377; $14,995.
Prepress proofing—tabloid size/most complete: Rainbow; 3M, 612/733-1110; estimated street price of $20,000.
Prepress proofing—letter size: ProofPositive Full Page; SuperMac Technology, 408/541-6100; $7999.
General publishing and business: Phaser IISDX; Tektronix, 503/682-7377; $9995.

PERSONAL PRINTERS, Sep 93
Ink-jet: StyleWriter II; Apple Computer, 408/996-1010; $359.
PostScript laser: TI microLaser Series; Texas Instruments, 512/250-6679; $1199 to $1599.
QuickDraw laser: LaserWriter Select 300; Apple Computer, 408/996-1010; $839.

WORKGROUP PRINTERS, Feb 94
High-speed: Hewlett-Packard 4Si MX; Hewlett-Packard, 800/752-0900; $5499.
Best buy: ✣ Apple LaserWriter Pro 630; Apple Computer, 408/996-1010; $2529. ✣ Hewlett-Packard LaserJet 4M; Hewlett-Packard, 800/752-0900; $2329.

SCANNERS

LOW-COST COLOR SCANNERS, Nov 93
$1300 to $1600: ✣ La Cie Silverscanner II; La Cie, 503/520-9000; $1599. ✣ Hewlett-Packard ScanJet IIc; Hewlett-Packard, 800/752-0900; $1599.
Under $1300: Mirror 800 Plus Color Scanner; Mirror Technologies, 612/633-4550; $1299.

OCR, Nov 93
OmniPage Professional; Caere Corp., 408/395-7000; $995.

SYSTEMS/STORAGE

DOUBLE-SPEED CD-ROM DRIVES, Jul 93
Sheer speed: Pioneer DRM-604X; Pioneer, 408/988-1702; $1795.
Overall value: AppleCD 300; Apple Computer, 408/996-1010; $599.
Budget choice: NEC MultiSpin 38; NEC Technologies, 708/860-9500; $465.

HIGH-SPEED HARD DRIVES, Aug 93
2.7GB drives: ✣ Nova XL 2700; Microtech International, 203/468-6223; $2999. ✣ Vista 3.5GB; Relax Technology, 510/471-6112; $3499.
SCSI-2 adapter: QuickSCSI; PLI, 800/288-8754; $499.

MACINTOSH UPGRADES, Jun 93
SE accelerator (25MHz): Quik30; Novy Systems, 904/427-2358; $449 (without FPU).
SE/30 accelerator (50MHz or 33MHz): Universal PowerCache; DayStar Digital, 404/967-2077; 50MHz $999 (with FPU), 33MHz $449 (without FPU).
LC and LC II upgrades: Macintosh LC III Logic Board Upgrade; Apple Computer, 408/996-1010; $599.
Mac II accelerators: ✣ Radius Rocket 25i, Radius Rocket 33; Radius, 408/434-1010; 25i $1199, 33 $2499. ✣ Universal PowerCache series; DayStar Digital, 404/967-2077; $449 to $999.
IIfx SCSI accelerator: QuickSCSI; PLI, 800/288-8754; $499.
Quadra static-RAM cache card: FastCache Quadra; DayStar Digital, 404/967-2077; $299 for Quadra 700 and 900, $449 for Quadra 800 and 950.

MIDRANGE HARD DRIVES, Mar 93
Low-capacity drive: La Cie Cirrus 240; La Cie, 503/520-9000; $769.
Notable technology: DiamondDrive 510; Mass Microsystems, 408/522-1200; $2089.
Bargain: APS Fujitsu 520; APS Technologies, 800/874-1428; $1149.
All-around quality: hammer 525FMF FW8, 415/474-8055; $2799.

OPTICAL DRIVES, Dec 93
3½-inch: ✣ Epson OMD 5010; ClubMac, 800/258-2622; $959.
✣ 128 MO; APS Technologies, 800/874-1428; $899.
5¼-inch: ✣ Sharp JY-750, ClubMac, 800/258-2622; $1829.
✣ Infinity MaxOptical 11m; Peripheral Land Inc., 800/288-8754; $4113.

VIDEO/DISPLAY

24-BIT VIDEO CARDS, Apr 94
Inexpensive acceleration: PrecisionColorPro 24XP; Radius, 408/434-1010; $599.
continues

MACWORLD Editors' Choice

Full-featured acceleration: Thunder II GX•1360; SuperMac Technology, 408/541-6100; $4499.

HIGH-END VIDEO EDITING, June 94
Presentation Video: ✣ MoviePak2 Pro Suite; RasterOps, 801/785-5750; $4199. ✣ VideoVision Studio; Radius, 408/434-1010; $4499.
Corporate Video (Offline): Media Composer 400s; Avid Technology, 508/640-6789; $14,995.
Corporate Video (Online): VideoCube; ImMix, 916/272-9800; $40,500.

PHOTOSHOP ACCELERATORS, Apr 94
PhotoBooster; Radius, 408/434-1010; $999.

Software

ACCOUNTING/FINANCE

GROWING A SMALL BUSINESS, Nov 93
Small-business system: M.Y.O.B.; Teleware, 201/586-2200; $199.
Home office/personal finance: MacMoney; Survivor Software, 310/410-9527; $119.95.

BUSINESS TOOLS

STATISTICS, Oct 93
Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; $595.
Comprehensive package: SYSTAT 5.2.1; SYSTAT, 708/864-5670; $895.

CD-ROM

TOP 10 CD-ROMS, Mar 94
Overall: Seven Days in August; Time Warner Interactive Group, 818/955-9999; $79.99.

COMMUNICATIONS/NETWORKS

HIGH-SPEED FAX MODEM SOFTWARE, Oct 93
Faxstf; Telefocus, 816/886-9800; $79.

NETWARE CONNECTIVITY, Sep 93
NetWare for Macintosh; Novell, 801/429-7000; $495 for 5-user license to $2295 for 200-user license.

PROTOCOL ANALYZERS, Jul 94
EtherPeek, AG Group, 510/937-7900; $795.

SOFTWARE ROUTER, Jul 93
Apple Internet Router 3.0; Apple Computer, 408/996-1010; Basic Connectivity Package $499.

TERMINAL EMULATOR, Oct 93
VersaTerm; Synergy Software, 215/779-0522; $149.

GRAPHICS

2-D CAD, Jan 93
Low-end: BluePrint; Graphsoft, 410/461-9488; $295.
Midrange: PowerDraw; Engineered Software, 910/299-4843; $795.

3-D DESIGN, Aug 93
Price for performance: ✣ Ray Dream Designer 2.0.4; Ray Dream, 415/960-0765; $299. ✣ Alias Sketch 1.5; Alias Research, 416/362-9181; $995.
All-in-one solution: ✣ Infini-D 2.5; Specular International, 413/253-3100; $695. ✣ StrataVision 3D 2.6.1; Strata, 801/628-5218; $995.

CLIP ART'S GREATEST HITS, Jan 94
Overall collection: ✣ ClickArt Studio Series; T/Maker Company, 415/962-0195; $99.95 per volume. ✣ Electronic Clipper subscription service; Dynamic Graphics, 800/255-8800; $67.50 per month. ✣ Metro ImageBase Electronic Clip Art; Metro ImageBase, 800/525-1552; $74.95 per volume, CD-ROM $149.95. ✣ Images with Impact series; 3G Graphics, 800/456-0234; $99.95 to $129.95 per volume, CD-ROM $499. ✣ Typographers' Ornaments; Underground Grammarian, 609/589-6477; $25 per volume; ten TIFF albums $200; EPS volumes $50 each.

DRAW PROGRAMS (LOW-COST), Sep 93
Budget draw: Expert Draw; Expert Software, 305/567-9990; $49.95.
Budget draw/paint: UltraPaint; Deneba Software, 305/596-5644; $79.
Beginners' program: Aldus SuperPaint; Aldus Corp., 619/558-6000; $149.95.
Overall: Canvas; Deneba Software, 305/596-5644; $399.

FONT BUYERS' GUIDE, Mar 94
Text-face collection: Type On Call CD-ROM; Adobe Systems, 415/961-4400, 800/682-3623; $99 (includes the ability to unlock two families from preselected packages) plus $25 to unlock individual faces or $69 to $179 for unlocking families.
Display/decorative-face collection: Fontek; Letraset, 201/845-6100; $39.95 per face.
Bargain collection: Monotype ValuePack; Monotype, 312/855-1440; $89 for 57 fonts.

IMAGE DATABASES, Oct 93
✣ Aldus Fetch 1.0; Aldus Corp., 206/628-5739; $295. ✣ Multi-Ad Search 2.0; Multi-Ad Services, 309/692-1530; $249.

PAINT AND IMAGE-EDITING, Sep 93
Budget buy: Expert Color Paint; Expert Software, 305/567-9990; $49.95.
Overall program: Fractal Design Painter; Fractal Design Corp., 408/688-8800; $399.
Image-editing program: Adobe Photoshop 2.5.1; Adobe Systems, 415/961-4400; $895.

Vendors: Please write to Macworld Editors' Choice, 501 Second St., San Francisco, CA 94107, or send a fax to 415/442-0766 to inform us of changes in your phone number or your product's list price.

INTEGRATED SOFTWARE

INTEGRATED SOFTWARE, Feb 94
ClarisWorks; Claris Corporation, 408/727-8227; $299.

ORGANIZATION/PRODUCTIVITY

CALENDARS, Jul 93
Alarm system: ✣ First Things First; Visionary Software, 503/246-6200; $79.95.
✣ Smart Alarms Plus; JAM Software, 203/630-0055; $75.
All-around scheduler: Now Up-to-Date; Now Software, 503/274-2800; $99.
Meeting scheduler: Meeting Maker; On Technology, 617/374-1400; five-pack $495.

SALES-AUTOMATION SOFTWARE, Oct 93
✣ Contact Ease; WestWare, 619/274-5053; one user $395, five users $1495. ✣ CBS; Colleague Business Software, 512/345-9964; $495.

TEXT-RETRIEVAL SOFTWARE, Dec 93
Small system: On Location; On Technology, 617/374-1400; $129.
Multiuser system: Personal Librarian; Personal Library Software, 301/990-1155; $995.

PRESENTATION TOOLS

MULTIMEDIA AUTHORING, Mar 93
Entry-level: ✣ Action; Macromedia, 415/252-2000; $495. ✣ Passport Producer; Passport Designs, 415/726-0280; $495.

PRESENTATION SOFTWARE, Jul 94
Persuasion 3.0; Aldus Corp., 206/622-5500; $495.

UTILITIES

BRAVE NEW DOCUMENTS, Jan 94
Application-independent document distribution: Common Ground; No Hands Software, 800/598-3821; $189.95.
Book-length documents: FrameReader; Frame Technology, 800/843-7263; $84.95.

PRINTING, Sep 93
PC-printer cable packages: PowerPrint; GDT Softworks, 604/291-9121; $149.

VIRUS KILLERS, Jul 94
Commercial software: Virex; Datawatch, 919/549-0711; $99.95.
Free software: Disinfectant; free from online services.

VIRTUAL MEMORY SOFTWARE

VIRTUAL MEMORY, June 94
Virtual memory Software: Virtual 3.0; Connectix Corp., 415/571-5100; $99.
Memory Boosting Software: RAM Doubler 1.0.1; Connectix Corp., 415/571-5100; $99.

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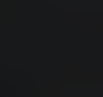
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Star Ratings

OVER 300 HARDWARE AND SOFTWARE REVIEWS AT A GLANCE

Edited by Wendy Sharp

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If a product has been upgraded since our last review, the most recent version number supplied by the vendor appears in parentheses after the reviewed version number. To read a full review of any product in the listing, please consult the issue listed at the end of each synopsis.

Vendors: Please write to *Macworld Star Ratings*, 501 Second St., San Francisco, CA 94107 to inform us of changes in the version number or list price of your product, or of changes to your phone number.

Software

BUSINESS TOOLS

★★★ **4D First 1.0, ACI US, 408/252-4444, $295.** This entry-level relational database is a low-cost way to distribute the power of 4D and 4D Server to an office full of Macs. It's not much easier to use, however, than the full-fledged 4D. May 94

★★★ **4D Server 1.0.1 (1.0.5), ACI US, 408/252-4444, $1495 to $3495.** Database server uses the ingenious multitasking technology built into 4D to make it appear that each client has the full resources of the server. If you use 4D on a network, you need this product. Jun 93

★★★ **Acrobat Exchange, Acrobat Distiller, Adobe Systems, 415/961-4400, $195 to $2495.** Complete, well-planned paperless office system creates application-independent viewable files that can be readily distributed on a network. Still, it's not yet as inexpensive or as convenient as you might wish. Oct 93

★★★ **@Risk 1.1, Palisade Corp., 607/277-8000, $395.** Statistical simulator for Microsoft Excel financial computations generates complex, statistically valid templates within Excel and is the first choice for analysts who work with probabilistic models every day. It assumes that the user is an Excel power user. Aug 93

★★ **BaseMap 1.0.1, GeoPoint, 415/957-1560, $149.** For simple maps displaying simple data, this mapmaking tool may be useful. It's not for the cartographic sophisticate, however, as it offers very limited data-display abilities and only one projection. May 94

★★★★ **ClarisImpact 1.0, Claris Corp., 408/727-8227, $399.** Business graphing, project management, orbject-oriented drawing, word processing, and presentation functions merge in this business graphics software. The outstanding integration offers versatility that dedicated programs are pressed to match. Jun 94 ◀

★★★★ **ClarisWorks 2.0, Claris Corp., 408/727-8227, $299.** Integrated program provides more features, is easier to use and faster, and has better integration among modules than other available programs. Aug 93 ◀

★★★★ **Common Ground 1.0, No Hands Software, 415/802-5800, $189.95.** Simple, robust document-interchange system is the clear choice for modest document-distribution jobs. In tests, it worked easily with documents from many different applications. Oct 93

★★★ **Cricket Graph III 1.5, Computer Associates International, 516/342-6000, $129.** Basic and foolproof charting program produces cleaner charts than Excel with little effort, although its feature set is fairly modest. Apr 94

★★★★ **DeltaGraph Pro 3, DeltaPoint, 408/648-4000, $195.** At its new lower price, this charting program is the best feature-for-feature value in Macintosh charting. There's even a new Chart Advisor function that suggests the appropriate display for your data. Apr 94 ◀

★★ **EasyFlow 1.1, HavenTree Software, 613/544-6035, $229.** The rough edges and distinctly un-Mac-like attributes of this flowcharting software reflect its DOS heritage, but on the whole it's easy to use. Sep 93

★★★ **Helix Express 1.0 (2.0), Helix Technologies, 708/465-0242, $439.** This relational database has an iconic programming language that sometimes baffles programmers, but provides an easy route into basic data-handling for nonprogrammers. Jul 93

★★★ **Helix Tracker 1.0, Helix Technologies, 708/465-0242, $439.** Well-designed workgroup-document manager has strong audit and annotation features; imposes just the right amount of administrative discipline. For large documents, however, Ethernet will look mighty attractive. Nov 93

★★ **Lotus Notes 3.0, Lotus Development Corp., 617/577-8500, $495 per client.** Well-organized, robust, and flexible business data system demands a full-time administrator, preferably with considerable programming experience, for effective use. Sep 93

★★★ **Map II 1.5, Think5pace, 519/661-4006, $395.** Well-structured program has most of the functions a simple geographical information system needs and is suitable for introductory instruction in GIS and for alert first-time users who just like maps. May 94

★★★★ **MarcoPolo 2.0, Mainstay, 805/484-9400, $395.** Inexpensive, easy-to-use product allows you or your workgroup to archive and retrieve documents, whether in electronic or paper form. Queries are easy to construct and searches are handled quickly. Sep 93

★★★ **Market Master Manager 3.5, Breakthrough Productions, 916/265-0911, $395 to $1995.** Sales-automation software is designed to keep track of contacts, generate mailings, and make sure that leads don't fall through the cracks. It includes a remote module, but it has some odd user-interface features. Oct 93

★★ **Memorizer 2.0, Brains Software Engineering, 432-231-28973 (Austria), $100.** Software records dictation, and you transcribe the dictation in a word processor. You may prefer to stick with a hand-held tape recorder, considering the product's RAM and storage appetite and its propensity to crash. Aug 93

★★★ **Micro Planner Manager 1.1, Micro Planning International, 303/757-2216, $695.** When you require cross-project resource sharing and leveling for a reasonable price, this project-management software has the edge. It has a generally intuitive interface, though there's a steep learning curve for its advanced features. Nov 93

★★★★ **Microsoft FoxPro for Macintosh 2.5, Microsoft Corp., 206/882-8080, $495.** Dazzlingly fast and easy to use relational database has a greatly improved interface and cross-platform compatibility. For projects of 4 to 20 users that handle large amounts of data (hundreds of thousands to millions of records) it offers excellent performance. Apr 94

★★★ **Office Tracker 1.1, Milum Corp., 512/327-2255, $195 to $995.** The efficient user interface of this software sign-out board, in both single-user and networkable versions, makes it easy to learn and use; but it has some minor flaws. Dec 93

★★★★ **Project Scheduler 5, 5citor Corp., 415/570-7700, $695.** For most midrange project-planning, this program's many hits outweigh its few misses. It goes beyond the requisite scheduling options, with inflation factors and unlimited projects in memory, and it conforms to accepted standards, so you get consistent, predictable results. Aug 93

★★ **Useful Voice Processor for Macintosh 1.1v7 (1.1v9), Useful 5oftware Corp., 508/774-8233, $179.95.** Dictation software lets you record and transcribe on a Mac. It has some useful features, but you must take uncommon care to avoid crashes. Dec 93

★★★ **Wingz 1.1ae, Informix Software, 913/599-7100, $399.** Low-overhead spreadsheet offers advanced-math functionality, a competent calculating engine and superior charts; but is missing outlining, real 3-D spreadsheet linking, and the host of third-party add-ons offered for Microsoft Excel. Jul 93

★★★ **WordPerfect Works 1.2, WordPerfect Corp., 801/225-5000, $249.** This program offers seven well-integrated and flexible modules. It has a few shortcomings, including some memory-management prob-

continues

Star Ratings

lems, but buyers should generally be pleased. **Jun 93**

COMMUNICATIONS/NETWORKS

★★ **AccessPC 3.0, Insignia Solutions, 415/694-7600, $129.95.** Utility translates most word-processor and some database formats, but it doesn't translate graphics and some of its translations result in data loss. **Apr 94**

★★★ **Crosstalk for Macintosh 2.0, Digital Communications Associates, 404/442-4000, $195.** Commendable communications product has a feature set that well matches its competition. Still, the script editing is complex and you must manually enter phone numbers each time you use it. **Apr 94**

★★★ **Delrina FaxPro for Macintosh 1.0, Delrina Corp., 408/363-2345, $129.** Fast, efficient fax software has an excellent address-book feature but also has some interface quirks and minor bugs. **Feb 94**

★★★★ **DOS Mounter Plus 4.0, Dayna Communications, 801/269-7200, $100.** File-transfer and translation utility works with floppies, removable drives, and network volumes and supports wild cards in DOS extensions. **Apr 94**

★★★★ **EtherPeek 2.0.3, LocalPeek 2.0.3, TokenPeek 1.0 (2.0.3), AG Group, 510/937-7900, $495 to $995.** Priced at a fraction of the cost of dedicated hardware analyzers, these network analyzer tools give you better analysis with a friendlier interface. They're a worthwhile investment. **Jan 94**

★★★★ **MacLink Plus/Translators Pro 7.5, DataViz, 203/268-0030, $149.** If your PC files are in archaic formats, you'll need this file-transfer and translation utility. It's a great option for most users, but it doesn't support removable drives or network volumes. **Apr 94**

★★★ **On The Air 1.0.1 (1.0.2), Digital Eclipse Software, 510/547-6101, $79.99 to $639.99.** Intercom system transmits System 7 SND resources, SoundEdit, and AIFF sound files across a network. It's well designed and performs decently, but its usefulness seems limited. **Aug 93**

★★★ **On The Road 1.1, Connectix, 415/571-5100, $99.** Helpful PowerBook utility looks at what's hooked up to your computer and adjusts accordingly—for example, printing when a printer is available and otherwise deferring printing. It only supports some hardware, however, so check before buying. **Dec 93**

★★★★ **Silver Cloud 1.2, AG Group, 510/937-7900, $495.** If you are administrating a large network and are drowning in a sea of devices and zones, this network-management software will make your life simpler. **Feb 94**

★★★ **SITcomm 1.0, Aladdin Systems, 408/761-6200, $120.** Inexpensive telecommunications software is fairly easy to set up and use, and will do well for people who use just one or two online services. Still, it lacks true scripting and has limited protocol options. **Apr 94**

★★★ **Snap Mail 1.01, Casady & Greene, 408/484-9228, $200 to $1440.** Software will put you on the electronic-mail trail more easily and more cheaply than any competing product, if you can live with some minor (but surprising) shortcomings. **Jun 94**

★★ **SoftPC 3.1, Insignia Solutions, 415/694-7600, $499.** While the speed of this Windows PC emulator is greatly improved, buying an add-in PC card for your Mac is more efficient. **Mar 94**

★★★★ **Timbuktu Pro, Farallon Computing, 510/814-5000, $199 to $1999.** Terminal emulation product is a must-have for in-house technical-support staff and for people who need direct connection to computer systems on a variety of networks. The major enhancements of this version are TCP/IP support for Macs and noticeably faster screen redraw. **May 94**

★★ **TrafficWatch II 2.0, Neon Software, 510/283-9771, $495.** The price of this AppleTalk traffic monitor is closer to that of full-blown network analyzers that do much more, albeit with greater complexity. Without printing, alarms, triggers, or true multiprotocol support, this product misses the mark. **Jun 94**

★★★★ **VersaTerm 5.0, Synergy Software, 215/779-0522, $195.** The price and feature set of this network terminal-emulation package make it a terrific value, in spite of its complex documentation and limitations. If you're looking for a fast path to Internet connectivity, this is it. **Jan 94**

DESKTOP PUBLISHING

★ **AboutFace 1.1.1 (1.1.2), Big Rock Software, 716/288-2860, $69.95.** Type-specimen generator has many serious deficiencies that need to be addressed. **Jan 94**

★★★★ **Aldus Fetch 1.0, Aldus Corp., 206/622-5500, $295.** The rich feature set and network support of this image-cataloging software make it a clear winner. Although cataloging is slow, users have fine control of the depth and compression of thumbnails. **Aug 93**

★★★★ **Aldus PageMaker 5.0, Aldus Corp., 206/622-5500, $895.** Desktop publishing software has added the features, both great and small, that it's been lacking, while still retaining the ease-of-use advantages that it's always had. This is a superb upgrade. **Nov 93**

★★★ **Cumulus 1.1 (1.2), Canto Software, 415/431-6871, $295 to $895.** Good network support, plus a feature that creates a protocol file for recording user actions, make this image-cataloging program a good choice for workgroups. It doesn't have an image-preview feature, nor does it offer 32-bit thumbnails. **Aug 93**

★★★ **Expanded Book Toolkit 1.0.1 (2.1), The Voyager Company, 310/451-1383, $295.** Using this hypermedia publishing program, average mortals can create highly functional multimedia books in a fraction of the time it would take to do the job unassisted. Be aware, though, that it's no QuarkXPress. **Jun 93**

★★★★ **FontMonger 1.5.7, Ares Software Corp., 415/578-9090, $149.95.** Font-conversion utility provides cross-platform, cross-font conversion and makes it easy to create composite, subscript, superscript, and rotated characters. **Sep 93**

★★ **FotoTune 1.1, Agfa Division of Miles, 508/658-5600, $795.** Color-management software has a capable engine, but it's not the complete color management system Agfa touts. Invisible tech support and poor documentation were only part of the problem. **Apr 94**

★★★★ **FrameMaker 4.0, Frame Technology Corp., 408/433-3311, $895.** For such projects as long, structured documents—books, instruction manuals, and textbooks—this desktop publishing program is one of the best tools available. It's fast, well mannered, and a real time-saver. **Mar 94**

★★ **ImageAccess 1.0, Nikon, 516/547-4355, $495.** This expensive image-cataloging program has an unusual interface and cannot be used over a network. A plug-in module provides direct support for Nikon's LS-3510AF film scanner. **Aug 93**

★★★ **Kodak Color Sense 1.0, Eastman Kodak, 716/253-0740, $499.** Color-management system gives average users access to a reasonable level of color consistency at a reasonable price. It does not make color separations. **Oct 93**

★★ **Kudo Image Browser 1.0 (1.1), Imspace Systems Corp., 619/272-2600, $195.** This image-cataloging software cannot control thumbnail depth or compression and doesn't have a keyword feature or allow multiple users to access the catalog simultaneously. The unique Riffle feature lets you quickly scan images. **Aug 93**

★★★★ **Print Shop Deluxe, Broderbund Software, 415/382-4400, $50.** Even the most ham-fingered can create professional-looking greeting cards, signs, banners, letterhead stationery and calendars with these desktop publishing templates and graphics. While it's not a substitute for a high-end program, it is easy to use and inexpensive. **Apr 94**

★★★★ **QuarkXPress 3.2, Quark, 303/894-8888, $895.** This upgrade adds the EfiColor XTension to ensure the greatest possible fidelity of color images and is a must-have for professional color publishers who use Quark. For others, the enhancements are welcome but minor enough that they provide little incentive to upgrade. **Nov 93**

★★★★ **Tableworks Plus 1.05, Npath, 206/392-7745, $299.** Publishing utility adds a full table-editor to QuarkXPress and is a must-have for anyone doing even mildly complex tables. **Jan 94**

EDUCATION

★★★★ **Decimal & Fraction Maze 1.2 (1.2.3), Great Wave Software, 408/438-1990, $69.95 to $89.95.** Education software weaves the threads of eight math curricula—from third grade to eighth, along with two levels of adult education—into an interesting and visually stimulating game. **Jul 93**

★★★★ **How Computers Work, Time Warner Interactive Group, 818/955-9999, $79.99.** Graceful, well-integrated CD-ROM tutorial guides the curious through brief but helpful explanations of basic computer technologies. **Jan 94**

★★★ **HyperStudio, Roger Wagner Publishing, 619/442-0522, $179.95.** Hypermedia authoring tool supports color and many multimedia functions through easy-to-use dialog boxes, but the interface doesn't always follow Apple guidelines. **Dec 93**

★★★ **MacGrade 1.5.5, CalEd Software, 800/795-0641, $85 to $245.** Grade-book program has a straightforward, simple interface and clear documentation. Although there's room for improvement, it's easy to use and flexible. **Feb 94**

★★★ **Millie's Math House 1.0 (1.1), Edmark Corp., 206/556-8400, $49.95.** Math-education software provides ways for preschoolers to experiment with numbers and counting. It's engaging, but more advanced levels would keep children challenged longer. **Jul 93**

★★★★ **The Rosetta Stone, Fairfield Language Technologies, 703/432-6166, $395.** Foreign-language instruction on CD-ROM is a valuable educational tool and fun to use. The lessons are well paced, and the content is generally excellent and diverse. **Jan 94**

ENTERTAINMENT

★★★ **BlackJack Trainer, ConJelCo, 412/492-9210, $75.** Learn the strategies you need to win at blackjack with this program. There are a number of trivial bugs, but they won't get in the way. **Oct 93**

★★★★ **Crystal Crazy, Casady & Greene, 408/484-9228, $49.95.** Ultraglossy, superpolished version of the classic Crystal Quest is challenging and fun without being overly difficult. Each level retains some old elements, and adds some new ones to keep you on your toes. **Jun 94**

★★★ **Daily Sports Quiz 1.0, DreamTime, 619/236-1341, $49.95.** If you think you know a lot about sports and love to play trivia games, then this entertaining and informative game is for you. Oct 93

★★★★ **Falcon MC 1.0, Spectrum HoloByte, 510/522-1164, $69.95.** Whether you're an armchair jet jockey or an experienced fighter pilot, you're bound to be impressed by the 4-bit color, enhanced graphics, and sophistication of this latest incarnation of the original Macintosh combat flight simulator. Dec 93

★★★ **Firefall Arcade, Inline Software, 203/435-4995, $49.95.** If you loved the classic video game Centipede, or are just looking for a fun shoot-'em-up, this arcade-style game will satisfy. Jun 94

★★★ **Hell Cab 1.0.1, Time Warner Interactive Group, 818/955-9999, $99.99.** Take a diabolical New York cabbie with a penchant for time travel, toss in the Empire State Building, add a few brainteasers, and you've got this engaging game on CD-ROM. It's slow and the arcade sections are hard to control, but overall it succeeds. Jan 94

★★★ **Indiana Jones and the Fate of Atlantis, LucasArts Games, 415/721-3394, $59.95.** In this game, the whip-wielding archaeologist goes looking for Atlantis and finds it armed to the gills with magical technology and Nazi stooges. If you're not bothered by the story's astonishing sexism, you'll find it diverting. Oct 93

★★★ **The Journeyman Project 1.0 (1.2), Presto Studios, 619/689-4895, $79.95.** Interactive science-fiction epic on CD-ROM is a work of art. The scenes are rich with painstakingly detailed graphics, elaborate models, and subtle textures, but the sluggish pace may leave you impatient and bored. Sep 93

★★★★ **Myst 1.0, Brøderbund Software, 415/382-4400, $59.95.** The smooth pacing of actions and sounds in this beautiful CD-ROM game give it a dreamlike quality. This is a game that's been polished until it shines. Mar 94

★★★★ **Seven Days in August, Time Warner Interactive Group, 818/955-9999, $59.99.** Compelling, interactive documentary on CD-ROM cuts a slice from history and offers August 10 through August 16, 1961, (the building of the Berlin Wall) to viewers in a way that truly evokes the period. Oct 93

★★★★ **SimCity 2000, Maxis Software, 510/254-9700, $69.95.** In essence, your goal with this marvelous city-simulation software is to build a city and run it successfully. The game is fascinatingly complex, but it's simple to use, and the elaborate graphics are so lovely that it's even fun just to watch. Jun 94

★★★★ **Spectre Supreme, Velocity Development, 415/274-8840, $69.95 to $89.95.** The pleasure of this game comes not in high scores, but in the almost addictive sense of control you get from moving your tank around the screen. It's so much fun that it's even fun when you lose. Dec 93

★★★★ **Spin Doctor, Callisto Corp., 508/655-0707, $59.95.** In the tradition of the best Macintosh games, this game tests your wits and reflexes alike. It's part strategy game, part kinetic sculpture. Jun 94

★★★ **V for Victory: Utah Beach, Three-Sixty Pacific, 408/879-9144, ext. 23, $69.95.** The post-D-Day conquest of Normandy is re-created in this game; its strength is the way it blends easy play with complicated strategy. Some bugs exist. Oct 93

FINANCE/ACCOUNTING

★★★★ **Andrew Tobias' TaxCut 1993, MECA Software, 203/255-1441, $79.95.** The free-form approach and flexible Help menus of this tax-preparation software make filling out your tax return a smooth, almost relaxing process. The only state versions available are California and New York. Apr 94

★★★★ **BestBooks 1.0, Teleware, 201/586-2200, $99.** In a straightforward, unintimidating manner, this small-business accounting program integrates the standard bookkeeping functions of accounts receivable, accounts payable, and general ledger. Jul 93

★★★ **ExpensePlus 1.0.1, State of the Art, 714/753-1222, $139.95 to $159.95.** Software uses a Newton MessagePad to record expenses, then sends the data to a Mac to create and print expense reports. While it's a real time-saver, you'll need AppleScript expertise to modify the expense reports. Apr 94

★★★★ **MacInTax 1993, ChipSoft, 602/295-3110, $69.95.** Tax-preparation software provides a reasonably detailed manual and a reliable, structured interface for building your tax return. Its inability to accept figures containing amounts in cents or round off to whole dollar amounts will frustrate some users. Apr 94

★★★ **MacInTax Tax Planner, ChipSoft, 602/295-3110, $19.95.** Software allows you to construct a five-year forecast of your tax liability, projecting tax figures through 1997 in a concise summary format. If you have a tax preparation program, you can do the same thing by creating alternative tax returns. Apr 94

★★★ **MacInTax Tax Savings Guide, ChipSoft, 602/295-3110, $19.95.** Simple, straightforward collection of well-written, fully indexed tax tips and suggestions is designed to help you better understand your tax return and reduce your tax liability. Although strong in content, it doesn't allow you to copy and paste, export as a text file, or even print. Apr 94

★★★ **Managing Your Money 6.0, Meca Software, 800/820-7457, $79.95.** Personal-finance program does a good if somewhat roundabout job of keeping track of your total financial picture. Although it isn't as easy to use as the competition, it excels in tax, investment, and financial planning. Jun 94

★★★★ **Quicken 4, Intuit, 415/858-6095, $69.95.** Personal-finance software is powerful and easy to learn, even for a financial neophyte. Although slower than previous versions, 4.0 lives up to its promise of making financial chores easier and better organized. Nov 93

GRAPHICS

★★★ **addDepth 1.0.2, Ray Dream, 415/960-0768, $179.** The purpose of this graphics program is to enhance the creation of 2-D images with 3-D effects. It's versatile, accommodating, and affordable, but working on complex images gets tedious because of the automatic application of styles. Aug 93

★★★★ **Adobe Illustrator 5.0, Adobe Systems, 415/961-4400, $595.** The Mac's most dependable draw program has added enough new features to boggle the mind. It still can't import TIFF images, but it catches up with, and in some areas surpasses, the competition. Nov 93

★★★★ **Adobe Photoshop 2.5 (2.51), Adobe Systems, 415/961-4400, $895.** No graphics program is as universally loved as this one, but while this upgrade builds on the program's capabilities, it ignores some minor weaknesses that have begun to peek through the product's armor. It's still great but perhaps not perfect. Jun 93

★★★★ **Aldus FreeHand 4.0, Aldus Corp., 206/622-5500, $595.** The new page-design and text-editing functions of this powerful draw program make it more than worth the price of admission. Aside from some bewildering interface elements, it's an outstanding program. Mar 94

★★★★ **Alias Sketch 1.5, Alias Research, 416/362-9181, $995.** The enhanced modeling and revamped rendering capabilities of this 3-D illustration program contribute to a tremendous and reliable upgrade, a heartening example of a company listening to its users. Jul 93

★★★★ **Blueprint 4, Graphsoft, 410/290-5114, $295.** Entry-level 2-D drafting program is a wonderful antidote to the complicated CAD system blues. Don't be misled by the low price; this full-fledged drafting package is powerful enough to serve professionals who appreciate the value of simplicity. Jul 93

★★ **BrushStrokes 1.0, Claris Clear Choice, 408/727-8227, $139.** If you have absolutely no experience with computer graphics, the simplified interface of this 24-bit paint program might warrant its price. Otherwise, you can find better programs for less. Oct 93

★★★ **CA-Cricket Draw III 2.0 (2.01), Computer Associates International, 516/342-5224, $249.** This draw program is not going to inspire experienced Mac artists to jump up and down, but its features are abundant, the interface is straightforward, and the price is right. Oct 93

★★★ **Canvas 3.5, Deneba Software, 305/596-5644, $399.** Draw program offers two to three times as many features as any competing program, but our reviewer would prefer an interface that you can navigate without scrambling for the manual. Jan 94

★★ **ColorUp 1.0, Pantone, 201/935-5500, $99.95.** Professional graphic designers don't need the advice of this color tutorial and series of palettes. Although nonprofessionals might benefit from the information on color theory, it may not be worth the money. Nov 93

★★★★ **DeBabelizer 1.5 (1.5.5), Equilibrium Technologies, 415/332-4343, $299.** Bitmapped-graphics-conversion software supports a huge number of file formats and can work wonders. If you spend any significant time dealing with file conversion, you should have this program. Nov 93

★★★ **DesignWorkshop 1.0 (1.1), Artifice, 503/345-7421, $895.** The accessible interface and versatile modeling environment of this 3-D modeling software may be worth the fairly high price, particularly for architectural-design conceptualization. May 94

★ **Easy Color Paint 3.0, MECC, 612/569-1500, $59.95.** For a program that purports simplicity, this color paint program is anything but. Possibly the weakest, least intuitive paint program for the Mac, it's unnecessarily complex and frustrating. Jul 93

★★★ **Expert Draw 1.0, Expert Software, 305/567-9990, $49.95.** Inexpensive draw program is not really for experts, but it offers a decent, no-frills set of basic drawing tools and commands for beginning illustrators, office use, or anyone on a budget. Aug 93

★★★★ **Folio 1 Media Kit-Print Pro, D'Pix, 614/299-7192, $499.95.** Each image in this texture collection on three CD-ROMs provides a dynamic range of colors, highlights, and shadows; is free of artifacts; and is crisply focused. Aug 93

★★★★ **Fractal Design Painter 2.0, Fractal Design Corp., 408/688-8800, $399.** If you can put up with a few inconveniences, this color paint software provides the tools required by professional artists, and many of its functions—natural-media brush tools, the color-sensitive magic wand—are entirely without peer. Jul 93

★★★ **Generic CADD 2.0, Autodesk, 206/487-**

continues

Star Ratings

2233, $495. Competent, midlevel 2-D drafting program has a well-executed Mac interface, a good complement of tools, and a sprinkling of high-end features, such as floating-point precision. Aug 93

★★★ **Infini-D 2.5.1, Specular International, 413/253-3100, $695.** Serviceable 3-D graphics program has a wide range of modeling, rendering, and animation options, with a straightforward interface and quick operating speed. Feb 94

★★★★★ **Kai's Power Tools 2.0a, HSC Software, 310/392-8441, $199.** Phenomenally powerful suite of Photoshop plug-ins have an addictive quality typically associated with arcade games. There's no end to the automated effects you can generate, the ways you can apply them, and the artwork you can create. May 94

★★★★ **MacroModel, Macromedia, 415/252-2000, $1495.** This 3–D modeling software is a solid resource to have along when you venture out into 3-D space. The interface is elegantly simple, making the Mac's inner space a more pleasant place to work. May 94

★★★ **Ofoto 2.0 (2.02), Light Source Computer Images, 415/461-8000, $395.** Many new features—notably color support—have been added to the already impressive toolbox of this scanning software. It often produces good results, but it rarely produces the best scan possible for a given image and output method. Jul 93

★★★★ **Paint Alchemy 1.0, Xaos Tools, 415/487-7000, $99.** For the price, these plug-in graphics effects are a tremendous value that both casual users and professional artists can use to design a little chaos into their work. May 94

★★★★ **PosterWorks 3.0, 5. H. Pierce & Co., 617/338-2222, $395.** This large-format graphics production tool is for people who think big, up to 10,000 square feet big. It fills the need for user-defined, full-color, large-format output robustly and elegantly. Aug 93

★★★★ **PowerDraw 4.0 (5.0), Engineered Software, 910/299-4843, $795.** The best new feature of this polished 2-D drafting program is an open architecture that supports modules that let you customize the program with application-specific tools, floating palettes, and menu commands. Sep 93

★★★★ **Showplace 2.0, Pixar, 510/236-4000, $495 to 695.** Adequate, entry-level, 3-D modeler is suitable for illustration and other graphic arts applications. This version offers improved access to MacRenderMan, one of the best renderers around, plus plug-in modeling tools. Apr 94

★★★ **StrataVision 3d 2.6.3, Strata, 801/628-5218, $995.** 3-D program includes animation, and is a superior rendering tool and versatile modeler. It's a challenge to learn, however, as the interface is overly dense and sometimes sluggish. Feb 94

★★★★ **StudioPro 1.0, Strata, 801/628-5218, $1495.** If you need a well-balanced, all-in-one 3-D modeling, rendering, and animation solution, this application is an excellent choice. Mar 94

★★★ **Transverter Pro 1.0 (1.51), TechPool, 216/291-1922, $395.** Remarkable graphics-conversion software can read PostScript files and convert them to a variety of formats. As you might expect of a program attempting to fill such a tall order, its conversions are not always flawless, but it can be a lifesaver nonetheless. Nov 93

★★★ **Typestry 2.0, Pixar, 510/236-4000, $299.** An approachable interface, animation support, and outstanding Renderman rendering technology make this 3-D type-renderer a popular choice. This version improves on the original, but still lacks canned positioning effects. Jun 94

★★★ **upFront 2.0, Alias Research, 416/362-9181, $299.** Capable modeler is something of an acquired taste. However, take the time to learn it and you'll find useful, if unconventional and demanding, tools that are well suited for architectural modeling. Jan 94

★★★ **Virtus WalkThrough 1.1, Virtus Corp., 919/467-9700, $195.** Interactive 3-D modeling tool provides instantaneous access to rendered 3-D scenes, allowing you to travel through models at will. While it has some problems (such as occasionally just quitting), it's an excellent value. Jul 93

★★★ **Wraptures One, Wraptures Two, Form and Function, 619/536-9999, $95 each.** The images in these texture collections on CD-ROM are generally acceptable, although some are muddy and others are difficult to decipher at low resolutions. If you need images for repeating patterns, however, these repeat seamlessly and are a good value. Aug 93

MATH/SCIENCE

★★★ **Alchemy III, Tripos Associates, 314/647-1099, $950.** Molecular-modeling software can model decapeptides and DNA fragments, in addition to the expected small molecules, with refreshing alacrity on a Mac IIci or better. Sep 93

★★★ **Amazing Universe 2.1 (2.1a), Hopkins Technology, 612/931-9376, $79.95.** Space-image exploration package on CD-ROM offers an amazing variety of astronomical images with a very competent program (ProVision II) for modifying and inspecting those images. It assumes that users won't be fazed by such things as writing their own image-convolution matrices. Aug 93

★★★★ **Caduceus Science Review Macintosh Project 1.0, Scientia, 617/776-3427, $150 to $250.** If you're taking the MCAT, you'd be nuts not to buy this interactive science review. With proper use, its 9MB of files are certain to improve your score. Apr 94

★★★★ **CircuitMaker 3.0, MicroCode Engineering, 801/226-4470, $199.95.** Much of the tedium of diagramming circuits and constructing prototypes is relieved by this digital circuit simulator that provides a powerful set of basic tools for a very reasonable price. Aug 93

★★★★ **CSC ChemOffice 2.0, Cambridge Scientific Computing, 617/491-6862, $995 to $1595.** Comprehensive chemistry software is the Mac equivalent of software that seven years ago would have cost $200,000 and required an equally costly minicomputer. It's a winner. Feb 94

★★★ **FASTAT 2.0, SYSTAT, 708/864-5670, $199.** Statistical business-analysis software makes sense as a day-to-day statistics tool. It provides the right tests for most requirements, and its graph types provide plenty of information, although they lack glamour. Jun 93

★★★ **f(z) 6, Lascaux Graphics, 602/299-0661, $115.** The main problem this math software attacks is four-dimensional visualization. It costs slightly more than a textbook, making it a great educational bargain. Sep 93

★★★ **InStat 2.01, GraphPad Software, 619/457-3909, $95.** For scientists with limited statistics backgrounds, the chatty clarity of this lab-oriented statistics software's help screens will be invaluable, while the limited variables and minimal graphics won't be a problem. Nov 93

★★★ **MathCAD 3.1, MathSoft, 617/577-1017, $495.** Numerical and symbolic computation software is easy to learn and use, and is much more powerful than earlier versions. It doesn't compete in scope with the largest math programs, but for most science and engineering tasks, it's a fast way to get problems solved. Jun 93

★★★★ **Mathematica 2.2, Wolfram Research, 217/398-0700, $595.** The one essential program in science and mathematics adds a function browser that makes the program as easy to use as it should be, as well as improvements to computational routines. Sep 93

★★★ **QC Tools 1.0, Abacus Concepts, 510/540-1949, $245.** Quality-control tool kit for StatView appears to introduce a slight slowdown in program response, but is generally well designed, well documented, and suitable for quality-control neophytes as well as professionals. Jan 94

★★★★ **Resampling Stats 1.0, Resampling Stats, Inc., 703/522-2713, $225.** Innovative statistics software has proved itself to be a superior teaching tool in numerous classroom tests. If you have any interest in statistics, you should give this admirably straightforward approach careful consideration. Jun 94

★★★★ **SerePlot 2.12, Scientfic Visions, 301/593-0317, $135.** If you have piles of data and don't need animated, exploding bar-charts in 24-bit color, this scriptable plotting software should be part of your analysis tool kit. Jun 94

★★★★ **Spyglass Dicer 2.0, Spyglass, 217/355-6000, $695.** Scientific 3-D visualization tool displays a two-dimensional slice through a three-dimensional object (which is represented in the computer by a data table). While Dicer pushes the limits of the Mac hardware, for its function this product is really the only game in town. Jul 93

★★★ **Spyglass Transform 3.0 (3.01), Spyglass, 217/355-6000, $595.** Scientific-visualization software can access data stored in every common format, offers some useful presentation-graphics features, and includes a programming language with a large range of built-in, high-level scientific functions. Sep 93

★★★★ **StatView 4.01 (4.02), Abacus Concepts, 510/540-1949, $595.** If your work uses statistics for decision support rather than abstract analysis, and you regularly have to present your results to nonstatisticians, this is the statistics package for you. Oct 93

★★★ **Sum Total 1.01, Concurrent Engineering Tools, 602/464-8208, $99.95.** Exceptional calculator utility is packed with advanced features, including a mode that lets you sample colors and use the numerical color values in calculations. The convenient palette approach causes a distinct time-lag in menu operations. Oct 93

★★★★ **Turing's World 3.0, CSLI Publications, 312/568-1550, $19.95.** Computer-science educational software lets you investigate some fundamentals in computing at an almost unbelievable bargain price. Feb 94

★★★★ **Visualization of Natural Phenomena, Telos/Springer Verlag, 408/249-9314, $59.95.** CD-ROM introduction to applying all aspects of computer graphics to scientific imaging covers all disciplines and offers definitive analysis of methods. No other source covers this much material, at this level of clarity. Jan 94

★★★★★ **Voyager II 1.0 (1.01), Carina Software, 510/352-7328, $159.95.** If a brilliantly lit, star-filled sky holds more than a moment's fascination for you, you need to know about this astronomy program. In a firmament of mostly faint and forgettable astronomy software, it's a supernova. Jul 93

ORGANIZATION/PRODUCTIVITY

★★★ **Achieving Your Career 1.02 (1.04), Up Software, 415/921-4691, $69.** HyperCard-based job-search software succeeds by compactly organizing. It provides a structure for identifying letters to write, phone calls to make, and interviews to follow up. Aug 93

★★★★ **Arrange 1.1, Common Knowledge,**

415/325-9900, $349. This personal information database's flexible, intuitive approach to data-handling makes it an excellent tool for storing all kinds of day-to-day information. May 94

★★★★ **CalendarMaker 4.0, CE Software, 515/224-1995, $59.95.** Polished, intuitive calendar-making program is straightforward, with a variety of options for customizing your calendar. Some features can be cumbersome. Oct 93

★★ **ClienTrac 1.7.1 (1.7.2), Whiskey Hill Software, 415/851-8702, $135.** Easy-to-use, HyperCard-based contact-management software performs as billed, but fails to inspire much enthusiasm. Aug 93

★★★ **Contact Ease 2.0.1 (2.0.2), WestWare, 619/274-5053, $395 to $1495.** Contact-management and sales-automation software helps salespeople keep in touch with contacts, makes it easy to generate letters, and maintains detailed records of activities. It has a few quirks but is overall a good program. Aug 93

★★★★ **DateBook and TouchBase Pro Bundle, Aldus Corp. Consumer Division, 619/558-6000, $149.95.** Calendar and contact manager offer a superior combination of integration, usefulness, and features. If you want to get organized, make sure you look at this dynamic duo. Feb 94

★★★★ **In Control 2.0, Attain Corp., 617/776-1110, $89.95.** The best features of an outlining program are combined with those of a database, making it easy to sort, search, organize, and print your to-do list. Aug 93

★★★ **Now Contact 1.0 (1.0.1), Now Software, 503/274-2899, $99.** This contact manager has some innovative features and could easily become the top address-book program for the Mac by adding some features, such as file reconciliation. Mar 94

★★★ **Power Team 1.0, ProVue Development Corp., 714/892-8199, $149.95.** Personal information manager consists of seven modules: Phone Book, Calendar, Correspondence, Checkbook, Calculator, Expense Report, and Mailing List. It has some bugs, but the data entry features are excellent. Oct 93

★★ **Rae Assist 1.0.2, Rae Technology, 408/725-2850, $199.** Although this personal-information manager offers some fresh ideas, including automatic linking of company and contact information, it's too big and too slow. Jan 94

PRESENTATION TOOLS

★★★★ **Adobe Premiere 3.0, Adobe Systems, 415/961-4400, $695.** Solid and dependable QuickTime video-editing software offers a structured, responsive, and flexible interface with enhancements that range from the mundane to the dramatic. It can now mix 99 tracks. Jan 94

★★★★ **Astound 1.0, Gold Disk, 408/982-0200, $399.** Presentation software lets you include sound, text, and graphics animation with no more effort than pasting in a chart in other products. It's a good value. Nov 93

★★★★ **Authorware Professional 2.0.1, Macromedia, 415/252-2000, $4995.** Multimedia-scripting and -presentation software lets you develop complex presentations with amazing speed. Although expensive, it's wonderfully done and will pay for itself in time saved. Feb 94

★★★ **Avid Video Shop 2.0, Avid Technology, 508/640-6789, $499.** QuickTime video-editing program shines in its intuitive, easy-to-use interface, although it may fall short on features for hard-core video professionals. Feb 94

★★★★ **CoSA After Effects 1.1, CoSA, 401/831-2672, $1295.** QuickTime movie editor blurs the boundaries between animation and traditional video-editing. It produces results that simply can't be created in other packages. Oct 93

★★★ **Deck II 2.1, OSC, 415/252-0460, $399.** AV Macs turn into digital-audio workstations with this software that enables you to record, mix, modify, and play back CD-quality sound. It doesn't include equalization features. Jun 94

★★ **Elastic Reality 1.0, ASDG, 608/273-6585, $349.** Exciting morphing tool can create professional-caliber results—if you can figure out how to use it. The needlessly convoluted interface, poor documentation, and inadequate tech support make that a difficult task. Feb 94

★★★★ **FlipBook 1.0, S.H. Pierce, 617/338-2222, $89.** Animation printing utility lets users make flip-books (consisting of a series of printed images that, through application of an extremely technical thumb-and-forefinger method, appear to move) out of QuickTime movies, PICS animations, and Scrapbook files. Jun 94

★★★ **Hi Rez Audio Volume 1.0, Presto Studios, 619/689-4895, $149.95.** The enjoyable, high-quality music on this CD-ROM adds a nice touch to presentations. The software for browsing the music is quirky, and the product could use some documentation. Jul 93

★★★★ **Morph 2.0, Gryphon Software, 619/454-6836, $239.** Easy to use morphing software is beautifully designed, with delightful new features, including the ability to morph QuickTime movies. Using it is as painless as morphing gets. Apr 94

★★★ **Passport Producer Pro 1.0, Passport Designs, 415/726-0280, $995.** Superb, albeit quite expensive, media-integration package makes assembling even complex presentations surprisingly easy. Path animation is limited to entrances and exits. Apr 94

★★★ **QuickFlix 1.0, VideoFusion, 419/891-1090, $149.** Approachable QuickTime moviemaking software lacks the high-end features of other programs but costs a whole lot less. Feb 94

★★★ **VideoFusion 1.0.1 (1.5), VideoFusion, 419/891-1090, $649.** Collection of special effects for QuickTime movies may not be for the casual user, but if you have the equipment and you can't live without spinning logos, then go ahead and indulge. Jul 93

★★★★ **Working Model 1.0, Knowledge Revolution, 415/553-8153, $995.** Animators and engineers will love this terrific motion simulator that mimics real motion by applying physical laws to objects. It's easy to learn and use, but you'll need some understanding of math and physics. Oct 93

PROGRAMMING

★★★ **CLImate 1.0, Orchard Software, 617/876-4608, $59.95.** With a little more documentation and a few more sample programs, this utility that provides a subset of Unix-like commands for the Mac environment could be an irresistable package. Oct 93

★★★★ **FutureBASIC 1.0 (1.02), Zedcor, 602/881-8101, $299.95.** Complete, easy-to-learn, real-world programming tool has full Toolbox, System 7, and assembler support. It's a wonderful tool that's rapidly becoming a favorite among commercial developers. Jul 93

★★★ **Macintosh Common Lisp 2.0 (2.0.1), APDA, 716/871-6555, $495.** Anyone who likes programming in LISP will be pleased with the environment provided by this version of the standard dialect and its extensive debugging and interface-building facilities. Oct 93

★★★ **Object Logo Student Edition, Paradigm Software, 617/576-7675, $49.95.** This book-plus-disk package offers a wide-ranging introduction to programming concepts. It's aimed roughly at the high-school educational level and lets you see something happen for every few lines of code you type. Jul 93

★★★★ **Object Master for Think C and C++, ACI US, 408/252-4444, $255.** Object-oriented development environment is full of goodies and will pay for itself in about a week due to increased programmer productivity. Apr 94

★★★★ **PG:Pro 1.5 (2.1), Staz Software, 601/255-7085, $169.** For part-time or novice programmers, the combination of these BASIC programming tools and FutureBASIC is a fast path to a working program. Jul 93

★★★ **PowerPacks 2.0, NDG Phoenix, 301/718-8880, $225.** Programmers' tool kit for 4th Dimension provides 280 external procedures to improve custom applications and exploit System 7 features. Don't expect any quick fixes for 4D's less-than-blistering performance in most areas, though. Oct 93

★★★★ **Smalltalk/V for Macintosh 2.0, Digitalk, 714/513-3000, $495.** Object-oriented development system is now even more viable for commercial projects, while Digitalk's customer support and documentation set a standard other vendors should emulate. Feb 94

★★★ **SoftPolish 1.1, Language Systems Corp., 703/478-0181, $295.** Program-quality-assurance utility systematically checks the resources in a program's interface against a huge laundry list of errors. It's a programming tool for anyone who hopes to produce a commercial Mac application. Sep 93

★★★ **SourceSafe 2.1, One Tree Software, 919/821-2300, $295 to $1195.** Solid, relatively easy-to-use product handles program-development administrative tasks, including version control, for multiplatform programs being created by groups. Sep 93

★★★★ **Symantec C++ for Macintosh 6.0, Symantec Corp., 408/253-9600, $499.** If you like Think C, you'll like this software-development system, too. For the Mac, it's an excellent opportunity to catch a new wave in programming. Nov 93

★★★ **VIP BASIC 1.0.1, Mainstay, 805/484-9400, $295.** Popular programming language lets programmers who know only BASIC get started producing real, if interpreted, Mac programs. It's a serious developer's tool, though it's not on the same footing as VIP-C. Jun 94

★★★★ **VIP-C 1.0.1, Mainstay, 805/484-9400, $495.** If you've mastered the rudiments of C, this programming-code generator will let you code about ten times faster than you could using only an editor. Its real strength is in rapidly assembling smaller projects. May 94

UTILITIES

★★★ **7th Heaven 2.5 (2.5.1), Logical Solutions, 612/659-2495, $99.95.** Our reviewer found the seven enhancements to System 7 fun and elegantly done, but not all of them were useful. Jul 93

★★★ **Alki Seek 2.1, Alki Software Corp., 206/286-2600, $39.95.** Competent file-finding utility scans by file name or content and lets you combine multiple search criteria. It cannot search in the background or find text in compressed files. Jul 93

★★★ **AppleSearch 1.0, Apple Computer, 408/996-1010, $1799.** Although it has some rough edges, this product for archiving and retrieving text is highly useful. It presents retrieved information clearly and extracts

continues

Star Ratings

text from documents in many formats. May 94

★★★ **Atticus Vista 1.0, Atticus Software Corp., 203/348-6100, $69.95.** Control panel and application automatically catalog the disks you mount on the desktop. It has a few problems, including limited search options, but it can help bring order to disorganized disk collections. May 94

★★★ **Billy Steinberg's PBTools 1.0.1, Inline Software, 203/435-4995, $99.55.** If you want basic PowerBook management without added frills or complex menu bar displays, this collection of four utilities may be just your cup of tea. Jul 93

★★★★ **CD-ROM ToolKit 1.0.5, FWB, 415/474-8055, $79.** Software accelerator can halve the time it takes to open files and search on a CD-ROM. The product supports a wide variety of formats and CD-ROM drives, but users should be aware that playback of QuickTime movies is often uneven. May 94

★★★ **Chameleon 2.0.3 (2.1), Logical Solutions, 612/659-2495, $59.95.** Sleek desktop-pattern editor comes with an ample supply of rich, textured color images and a set of limited but functional editing tools. Sep 93

★★★★ **ClickChange 2.0, Dubl-Click Software, 818/888-2068, $89.95.** Interface-customizing package has nothing you need but is filled with everything you want, including tools that let you alter major elements of the Mac's look and feel. Aug 93

★★★ **Connectix Desktop Utilities 1.0 (1.0.1), Connectix Corp., 415/571-5100, $99.** Although some of the 16 utilities offered in this package are more at home on a PowerBook, this collection offers one-stop shopping at a low price. It's worth it for the file-synchronization, Keyboard Power, and Hot Keys features alone. Nov 93

★★★★ **CopyDoubler 2.0 (2.0.1), Symantec/Fifth Generation Systems, 504/291-7221, $59.** This utility speeds up copying, lets you queue jobs for background copying, and offers a variety of other useful, copying-oriented features—all at a very reasonable price. Nov 93

★★★ **Copyright Pro 1.0.3, C5G Technologies, 412/471-7170, $79.** Utility takes over the Finder's copying function, copies in the background, and allows you to regularly schedule copying. It doesn't speed up copying, however. Nov 93

★★★★ **CPU 2.0 (2.0.1), Connectix Corp., 415/571-5100, $99.** Reasonably priced collection of utilities for the PowerBook adds new features, including file synchronization, that easily justify the upgrade price. Sep 93

★★★ **CryptoMactic 1.0.1, Kent Marsh, 713/522-5625, $99.** Security software offers fast Finder-level encryption and decryption with effective file removal. Although its simplest encryption algorithm isn't quite hacker-proof, it's worth considering. Feb 94

★★★★ **DiskLock PB 1.0, Symantec/Fifth Generation Systems, 504/291-7221, $59.** PowerBook security software balances robust security with simplicity and ease of use. It's much harder to crack than most PowerBook utility collections' security features, and will keep out all but the most determined. Jan 94

★★★ **The Disney Collection Screen Saver, Berkeley Systems, 510/540-5535, $49.95.** Mickey, Goofy, Peter Pan, Ariel, and other Disney favorites cavort around your screen with this screen saver that includes 16 different modules. Mar 94

★★★ **DriveShare 1.03, Casa Blanca Works, 415/461-2227, $129.95.** This utility allows users to share a removable drive over a network. It's most useful if your network consists of both System 6 and System 7 users, as its advantages over System 7 file sharing are slight. Nov 93

★ **DriveTech 1.0, MicroMat Computer Systems, 415/898-6227, $59.95.** Without decent documentation or clearer error messages, this floppy-drive cleaning and diagnostic program is essentially a $60 floppy-drive cleaning kit. Since you can buy a cleaning kit without software for $10, that makes it a bad deal. Jan 94

★★★ **DupLocator 1.03, Midnight Software, 303/933-1013, $99.** For new Macintosh users who don't have a general file utility, this software that locates duplicate files, as well as performs basic file commands such as moving and renaming files, may be useful. Jan 94

★★ **DynoPage 2.0, Portfolio Software, 802/865-2700, $59.95.** While this utility simplifies the printing of booklets and double-sided pages, it doesn't support PostScript graphics, is incompatible with some popular applications, and has a buggy drag-and-drop feature. Jul 93

★ **eDisk 1.0 (1.2), Alysis Software Corp., 415/566-2263, $149.95.** Driver-level compression software has little to recommend it over file-level, idle-time compression programs. The biggest drawback is the strong potential for disk or file corruption. Oct 93

★★★ **Freedom of Press Classic, ColorAge, 508/667-8585, $149.** Utility allows you to print PostScript graphics on almost any non-PostScript printer—easily and with impressive results. Mar 94

★★★ **Icon 7, Inline Software, 203/435-4995, $79.95.** Simple, straightforward utility has a streamlined and intuitive library feature for storing and retrieving icons, plus tools for icon editing. Its icon collection, however, is pretty paltry. Sep 93

★★★ **Icon-It Pro 3.0.6, Olduvai Corp., 305/670-1112, $129.** Utility allows you to attach custom tool bars to almost any application, including the Finder. The interface is quirky, but you get used to it. Dec 93

★★★ **I Like Icon 1.0, Baseline Publishing, 901/682-9676, $59.95.** Glitzy utility has tools for icon editing, has a nice library of icons, and can create animated icons. Some basic features, such as a text tool, are missing, and the animated icons are fun but impractical. Sep 93

★★★ **MacPak 1.0, Symantec/Fifth Generation Systems, 504/291-7221, $149.** The quality of this utility collection is uneven—some modules are unpolished—but if you don't already own AutoDoubler, CopyDoubler, and a good file-management program, it's worth the price. Jan 94

★★★★ **MacTools 3.0, Central Point Software, 503/690-8090, $149.** Recovering trashed files is a snap with this utility package that fixes more disk problems than its competition. It includes disk-and-file maintenance, disk repair, virus protection, and backup. Mar 94

★★ **Magic Typist 2.0, Olduvai Corp., 305/670-1112, $129.** If you want to speed up typing of repetitive phrases or if you don't have full use of your hands, this utility, which automates typing of repetitive phrases, may be useful, but some functions work erratically or not at all in Microsoft Word. Sep 93

★★★★ **Mr. File 2.0, Softways, 408/978-9167, $99.** The well-designed background capabilities of this Finder utility make it a handy tool for copying, finding, moving, launching, and renaming files, although it has a few interface quirks. Dec 93

★★★ **Now Compress 1.0 (1.0.1), Now Software, 503/274-2899, $69.** Compression utility holds its own in a crowded market; it's easy to use, it's complete, and it compresses as well as or better than other options. Dec 93

★★★ **Now Fun, Now Software, 503/274-2899, $45.** Five control panels let you liven up your Mac by customizing everything from menu colors to system sounds. The included screen-saver modules and desktop patterns and pictures are fairly limited, though. Dec 93

★★★★ **Now Utilities 4.0.1 (4.0.2), Now Software, 503/274-2899, $129.** Many thoughtful improvements have been added to this collection of utilities, which is now better integrated, more logically designed, and still an excellent deal for your dollar. The new scrapbook feature, however, is awkward and inconvenient. Aug 93

★★★ **Open Sesame 1.02, Charles River Analytics, 617/491-3474, $99.** Utility automates Finder operations, such as opening and closing files, without resorting to macros or scripts. It has an elegant interface, but people with strict work habits are more likely to find its suggestions worthwhile than are those who don't follow a routine. May 94

★★★ **OptiMem 1.4.1, Jump Development Group, 412/681-2692, $129.** Systemwide memory manager monitors RAM use and allocates RAM where it's needed. Works best with software that handles minimum-memory situations effectively. Mar 94

★★★ **Power To Go 2.0, Claris Corp., 408/727-8227, $99.** PowerBook utility collection has a few unique slants—including a floating palette that can display battery-life estimates—that keep it above the also-rans. It does lack features of similar products. Dec 93

★★★★ **QuicKeys 3.0, CE Software, 515/221-1801, $169.** The simple, unintimidating interface of this macro-building utility allows you to build a set of useful shortcuts quickly. Mar 94

★★★★ **RAM Doubler 1.0.1, Connectix Corp., 415/571-5100, $99.** Inexpensive system extension doubles available RAM for many Macintosh users. There are a number of requirements, however, including System 7, 4MB of physical RAM, and a 68030 board. May 94

★★★ **Redux Deluxe 2.0.2 (2.5), Inline Software, 203/435-4995, $79.95.** Easy to learn and relatively simple to use, this backup program has some powerful features, such as scripting, but it doesn't have a compression option. Jan 94

★★★★ **Retrospect 2.0, Dantz Development Corp., 510/253-3000, $249.** Powerful backup and archiving software has an improved interface and scripting capabilities, and works well for all levels of users. Sep 93

★★★★ **Retrospect Remote 2.0, Dantz Development Corp., 510/253-3000, $449.** Utility allows fast, automatic backup of networked Macs to a central Mac with a backup device. It worked flawlessly in our reviewer's tests. Sep 93

★★ **SafeDeposit 1.2, Dayna Communications, 801/269-7200, $189.** Automated backup program is easy to set up but slow. Also, unattended backups must be restarted from scratch if disk space runs short and a new disk isn't inserted. Sep 93

★★ **Safe or Sorry 1.0, Olduvai Corp., 305/670-1112, $59.** Unobtrusive control panel periodically saves all of your keystrokes, but requires System 7.1 and offers no clear-cut advantages when compared with other text-recovery programs. Oct 93

★★★★ **SAM 3.5.8, Symantec Corp., 408/253-9600, $99.** Efficient, thorough virus-protection software slows down system start-up and application launching, but this program is a worthwhile investment for anyone who exchanges or downloads files. Mar 94

★★★★ **Screenscapes 1.0.1, Kiwi Software, 805/685-4031, $44.95.** With more than 600 desktop patterns—and a suite of well-designed modules to transform those patterns—this fun and frivolous utility lifts desktop-pattern design to new heights of elegance. Nov 93

continues

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Star Ratings

★★★ **Square One 1.5.2, Binary 5oftware, 310/582-8293, $74.** Flexible, attractive icon-based file launcher provides infinitely customizable palettes, including one that displays active applications. The application will consume 400K of your system memory. Aug 93

★★ **5tacker for the Macintosh 1.0.1, 5tac, the Data Compression Company, 619/431-7474, $149.** As long as you pay attention to the capacity of your hard drive, this driver-level compression product performs reasonably well, except for its slow hard drive read quotient. Oct 93

★★★★ **Star Wars Visual Clips, Sound Source Unlimited, 805/494-9996, $89.95.** Control panel lets you play QuickTime movie clips from *Star Wars* at system events. If you have the money, the hard drive space, and the RAM, this is the kind of totally cool toy that will make you remember why you love your Mac. Sep 93

★★★ **Tempo II Plus 3.0.9, Affinity Microsystems, 303/442-4840, $179.95.** Very capable macro-creating utility may be daunting for novices but offers plenty of power for advanced users. Mar 94

★★★★ **TimesTwo 2.0, Golden Triangle Computers, 619/587-0110, $149.** This driver-level compression utility is transparent and robust. It caused no problems through a two-month course of testing, on a system with myriad utilities and system software tools. Mar 94

★★★★ **Toner Tuner 1.0.3, Working 5oftware, 408/423-5696, $24.95.** Inexpensive, incredibly useful extension adds a sliding bar to print dialog boxes allowing you to adjust the amount of toner applied to each print job. If you can't save trees, you can at least save toner. Dec 93

★★★★ **ultra5hield 1.252 (1.3), usrEZ Software, 714/756-5140, $149.** Sophisticated security product combines practically every feature you might need into an integrated package, including a lightning-fast version of the U.S. government data-encryption standard. Dec 93

★★★ **UnderWare 1.0.1, Bit Jugglers, 415/968-3908, $59.95.** Inspired, silly fun for your Mac's desktop comes from a control panel that adds three features: a screen saver, desktop patterns, and animations that run on your desktop while you work. The price for this whimsy is mostly in disk space. Jun 94

★★★★ **Virex 5.0, Datawatch Corp., 919/549-0711, $99.95.** The extremely fast, trouble-free performance of this software makes the task of guarding against computer viruses almost painless. Its speed puts it ahead of the pack. May 94

★★★ **Virtual 3.0.1, Connectix Corp., 415/571-5100, $99.** If you need to eke out as much virtual memory speed as possible, this utility may be a useful tool. For System 6 users who want virtual memory, it's the only game in town. Sep 93

★★★ **Working Watermarker 1.02, Working Software, 408/423-5696, $49.95.** Simple, useful system extension allows you to print or fax text and/or graphics "watermarks" in the background of virtually any document. Although it has imperfections, it's earned a permanent spot in our reviewer's System Folder. Jan 94

VERTICAL MARKETS

★★★★ **Claire, The Personal Music Coach 1.0.1, Opcode Systems, 415/856-3333, $129.95.** Musicianship program teaches pitch and interval recognition, sight singing, and intonation. Although the interface is nonstandard, it's logical and easy to learn. May 94

★★★★ **Finale 3.0.1, Coda Music Technology, 800/843-2066, $749.** Upgraded music-notation software is now infinitely more pleasant to use. Its comprehensive feature set makes it the standard against which all other music-notation products must be judged. Dec 93

★★ **MacInteriors, Microspot, 408/253-2000, $129.** Correctly placing objects is unduly cumbersome in this interior-design software, but once you catch on to the program's quirks, it's useful. Feb 94

★★★★ **Musicshop 1.0, Opcode Systems, 415/856-3333, $149.95.** MIDI sequencer is an excellent choice as a first sequencer. It's powerful enough to satisfy the needs of most MIDI users. Oct 93

★★★ **Roll Call 2.0 (2.5.6 or 3.0), By the Numbers, 603/927-4508, $495 to $595.** 4th Dimension database application for church management helps track donations, attendance, church-group membership, and visitation. While not a complete church-management system, it's an acceptable complement to a general accounting program. Aug 93

★★★ **Sailing Master 1.1, Starboard Software, 313/662-4393, $64.99.** Though the slow speed and jerky motion point to less-than-polished programming, this sailboat-racing simulation offers good tactical play and is fun—well worth the price for sailing competitors. Nov 93

★★★★ **WillMaker 5.0, Nolo Press, 510/549-1976, $69.95.** Legal software quickly and easily automates the creation of wills, health-care directives and proxies, and final-arrangements documents. It offers excellent supporting explanations, examples, and background. Jun 94

WRITING TOOLS

★★★★ **MacWrite Pro 1.5, Claris Corp., 408/727-8227, $249.** The clean, uncluttered interface of this low- to middle-level word processor is still one of its major assets. This upgrade adds support for QuickTime, PowerTalk, AppleScript, and more. May 94

★★ **MasterWord 5.1, Alki Software Corp., 206/286-2600, $99.95.** The centerpiece of this package of add-on Microsoft Word commands is a set of customizable tool bars. Unfortunately, rough edges remain, including inaccuracies in the documentation and some features that don't work as advertised. Aug 93

★ **The Oxford English Dictionary, Oxford University Press, Electronic Publishing, 212/679-7300 ext.7370, $895.** CD-ROM dictionary contains 20 print volumes, including half a million words, but the flaws, omissions, unreliability and unforgivably poor design are unbearable. Apr 94

★★★ **Random House Unabridged Dictionary, Random House Electronic Publishing, 212/572-2600, $179.** The most comprehensive American-made dictionary on CD-ROM works within any program and is good at guessing misspelled words. Although some functions don't work reliably, the quality and design of the software are better than those of other dictionaries on CD-ROM. May 94

★★★ **5pelling Coach Professional 4.0.1, Deneba 5oftware, 305/596-5644, $195.** If you're considering investing in reference software, this spelling checker, dictionary, and thesaurus is a relatively capable, if expensive, alternative. Oct 93

★★★★ **Thunder 7 1.5.3, Baseline Publishing, 901/682-9676, $99.95.** Stand-alone spelling checker and thesaurus interactively monitors your keystrokes and alerts you to potential errors as they are entered. It quickly and transparently prevents you from making embarrassing typos. Nov 93

★★★★ **WordPerfect for Macintosh 3.0, WordPerfect Corp., 801/225-5000, $495.** The innovative interface of this word processor uses context-sensitive button bars and expandable rulers to make innumerable features accessible with a click of the mouse. It's an accomplishment in ease of use. Mar 94

★★★★ **WriteNow 4.0.1, Word5tar International, 415/382-8000, $119.95.** Tidy word processor's conservative use of memory (the application fits into a dainty 600K partition) and graceful interface will continue to win it enthusiastic fans. This version adds elegant table capabilities and several PowerBook-friendly features. Jun 94

★★★ **A Zillion Kajillion Rhymes 1.0, Eccentric Software, 206/628-2687, $49.95.** Rhyming dictionary is quick, small, simple, and self-contained; but it only rhymes with the roots of search words (and ignores *-ed, -s,* and *-ing* endings). Nov 93

Hardware

MISCELLANEOUS HARDWARE

★★ **AC5100, Altec Lansing Consumer Products, 717/296-2818, $180.** Lightweight powered speakers don't sound as good as they should. There's too much emphasis on the high end at the expense of the midrange, and they hiss noticeably. Dec 93

★★ **AC5150, Altec Lansing Consumer Products, 717/296-2818, $150.** Subwoofer rounds out the sharp tones of the ACS100, but the bass response is neither punchy enough nor loud enough, and the unit is about the size and weight of a concrete block. Dec 93

★★ **Address Express, CoStar Corp., 203/661-9700, $499.** Flaky performance and system crashes plagued this envelope-and-label printer in our tests, but the print quality was good. Oct 93

★★ **Apple Adjustable Keyboard, Apple Computer, 408/996-1010, $219.** Keyboard is only a slight improvement on the flat slab keyboard. Theoretically, it corrects ulnar deviation, but many sufferers of repetitive stress injuries want a keyboard that adjusts vertically. Jul 93

★★★★ **Apple Color One5canner, Apple Computer, 408/996-1010, $1349.** Tests of this color scanner demonstrate unpolluted colors and sharp image details, perhaps due to color filters and lenses that Apple claims were designed and tuned for the scanner. Jul 93

★★★ **AppleDesign Powered 5peakers, Apple Computer, 408/996-1010, $179.** Tall and curvy powered speaker set looks and sounds good and can produce uncomfortably high volumes without noticeable distortion, but the bare-wire-and-terminal connections aren't user-friendly. Dec 93

★★★ **Apple Newton MessagePad, Apple Computer, 408/996-1010, $699.** Although Apple released this personal digital assistant too early and marketing hype led to mistaken expectations, this is a very intelligent piece of work with an impressive variety of serious business uses. Dec 93

★★★ **Apple PowerCD, Apple Computer, 408/996-1010, $400.** This extremely versatile and beautifully designed portable CD-ROM drive offers impressive audio and Photo CD features, but if you're a serious CD-ROM user, it's too slow to satisfy. Jan 94

★★★★ **ArtZ ADB Tablet, Wacom Technology Corp., 206/750-8882, $449.** Combining pressure-sensitive operation, manageable size, and a new pencil-thin stylus, this affordable digitizing tablet is perfect for artists looking for traditional-style control of their graphics

continues

Star Ratings

programs. Aug 93

★★★ **Computer Crayon, Appoint, 510/463-3003, $49.** The kid contingent's verdict was a definite thumbs-up on this brightly colored input device that's shaped like a thick pencil. The buttons can be hard for smaller children to press, and serious computer artists should still opt for a drawing tablet. Oct 93

★★★★ **Coolscan LS-10e, Nikon Electronic Imaging, 516/547-4200, $2600.** Compact desktop scanner for digitizing images from 35mm transparencies is slow, but delivers images good enough for newsprint publications and some catalogs. Dec 93

★★★★ **Cypress PhonePro 1.2, Cypress Research Corp., 408/752-2700, $349 to $950.** By improving its integration with FaxPro and with PowerTalk and PowerShare, this powerful telephony software has greatly extended its business scope. May 94

★★★ **DrawingSlate, CalComp Digitizer Division, 714/821-2000, $395.** Digitizing tablet is a good, compact, low-cost implementation of pressure sensitivity, although the battery-operated stylus is a bit heavy. Jun 94

★★★ **EMBARC, Embarc Communications 5ervices, 407/364-2000, $395 plus fees.** If you're a PowerBook user who is frequently in places with no telephone and you need timely delivery of electronic news and E-mail, this portable wireless message service may prove useful, but the cost may be prohibitive to others. Sep 93

★★★★ **Epson E5-800C, Epson America, 310/782-0770, $1499; Macintosh interface kit $399.** Flexible 400-dpi scanner offers a range of options, including one- or three-pass scanning, plus a full-featured, easy-to-use software package. Aug 93

★★ **Gulliver, Appoint, 510/463-3003, $119.** This diminutive mouse is hard to hold comfortably for an extended period, but it works well on almost any surface and is an acceptable option for PowerBook users. Oct 93

★★ **G-Vox, Lyrrus, 215/922-0880, $399.** Hardware-software guitar-instruction package lets your Mac "hear" the notes you play on your guitar. Although the hardware works well, the software has some basic problems and doesn't live up to the hardware. Apr 94

★★★ **Hello Music, Yamaha Corp. of America, 714/522-9240, $449.** MIDI starter kit includes an impressive tone generator that's compatible with General MIDI Level 1 and Roland MT-32, but the included software is functional at best. Dec 93

★★★ **Lightning5can Portable, Thunderware, 510/254-6581, $459.** PowerBook owners will find this hand scanner's modem- or serial-port connection, lightweight interface, and total portability well worth the cost, although the scanner is incompatible with some desktop Macs. Dec 93

★★ **Macintosh TV, Apple Computer, 408/996-1010, $2079.** As a computer, this combination computer-television-CD player is sleek but slow. You can get faster performance and better expandability from several less-expensive Performa models. Apr 94

★★★★ **Mirror 800 Plus Color Scanner, Mirror Technologies, 612/633-4450, $1299.** Add the NuBus JPEG board ($300) and easy-to-use 35mm transparency scanning module ($599) and to get a nifty—if slow—desktop scanning package for a reasonable price. Jan 94

★★★ **PenDirect ADB, FTG Data Systems, 714/995-3900, $498.** Input device lets you manipulate items on the Macintosh screen using a special stylus called a light pen. It works well, although it seems ergonomically inferior to a mouse for routine tasks. Mar 94

★★★ **PowerLink Presentor, E-Machines, 503/646-6699, $499.** Simple, compact Duo dock wobbles a bit when plugged in but provides fine support for a variety of displays, plus ports for ADB, floppy drive, and sound output. Nov 93

★★★ **PowerPlate, Technöggin, 513/321-1777, $169.95 to $299.95.** Line of long-lived, external PowerBook battery packs, each of which lets you work for three to five times as long as the usual PowerBook battery. Unfortunately, the System 7 power manager periodically alerts you that your battery is not charging and dims the screen though battery pack has hours of time left. Mar 94

★★★ **RCD-202, Pinnacle Micro, 714/727-3300, $3995.** Writable CD-ROM drive is good for archiving data simply and inexpensively, but it's incompatible with many hard drives. Mar 94

★★★ **5canMaker 35t, Microtek, 213/321-2121, $1999.** Speedy 35mm film scanner accommodates loose film and delivers a good image, but the included software is weak. Dec 93

★★★ **5canPlus Color 6000 for Mac, PlusTek USA, 408/980-1234, $749.** Small, inexpensive sheet-fed color scanner is not appropriate if exact color matching is critical, but it is otherwise a good, economical option. Sep 93

★★★★ **ThinPack, VST Power Systems, 508/287-4600, $199.95.** External battery pack for PowerBooks is compact, with a lightweight design. It comes with handy power-management utilities. Mar 94

★★★ **TrakMate, Key Tronic Corp., 509/928-8000, $149.** Input device integrates a trackball into a wrist pad. While the design is interesting, it's not for everyone. Feb 94

★★★ **Wacom UD-1212R, Wacom Technology Corp., 206/750-8882, $749.** Graphics tablet with pressure-sensitive stylus is easy to use and highly customizable, though it's incompatible with AppleTalk and AppleTalk Remote. May 94

★★★★ **Yamaha Y5T-M10 Powered Monitor 5peakers, Yamaha, 714/522-9240, $149.95.** Powered speakers have a good balanced sound and a great volume range at an outstanding price. Apr 94

MODEMS/NETWORK HARDWARE

★★★★ **AsantéHub 1012, Asanté Technologies, 408/435-8388, $1299.** This 12-port, 10BaseT Ethernet hub works right out of the box and is a premium device at a bargain price. Dec 93

★★★ **DataLink PB; Axcell Cellular Interface, Applied Engineering, 214/241-6060, $824.** If you need a full-blown office on the beach, this PowerBook cellular-modem package with automatic answering machine is a well-executed solution. Each recorded second requires 25K of disk space. Nov 93

★★★★★ **EtherWave, Farallon Computing, 510/814-5000, $129.** If you need to expand your network at a reasonable price with minimal fuss, get this Ethernet transceiver. Instead of providing only one 10BaseT twisted-pair jack, it includes a second jack that allows you to daisy-chain to another device through an additional 10BaseT line. May 94

★★★ **PerFit Port-A-Com, PerFit, 303/530-7333, $349.** Compact, ADB-powered, high-speed fax/data modem is difficult to configure, due to its Spartan and poorly organized documentation, but is still a solid product at a reasonable price. Nov 93

★★★ **5upraFaxModem 144PB, 5upra Corp., 503/967-2400, $349.95.** If you're looking for a high-speed internal modem for your PowerBook, and you want to save a few bucks, this modem is worth considering. Disabling its fax software solved occasional transfer problems. Nov 93

PRINTERS

★★★ **Apple Color Printer, Apple Computer, 408/996-1010, $2349.** If you need large-format color output, but not precision color-matching, this well-built printer is a reasonable choice, although it doesn't support PostScript. Aug 93

★★★★ **Apple Portable StyleWriter, Apple Computer, 408/996-1010, $439.** Sleek, portable ink-jet printer weighs 4½ pounds and is a pleasure to use. It uses standard StyleWriter cartridges. Jan 94

★★ **Brother HJ-400, Brother International, 908/356-8880, $369.** Compact, 360-dpi ink-jet printer is fairly slow and does not allow background printing. Some large files require additional application memory to print correctly. May 94

★★★★ **DeskWriter 310, Hewlett-Packard, 800/752-0900, $379 to $455.** Versatile, low-cost ink-jet printer is a 4.3-pound, battery-powered portable. With its 60-page sheet feeder, it's also a great desktop printer; and with a $49 color print cartridge, it offers inexpensive three-color printing. Mar 94

★★★ **HP LaserJet 4ML, Hewlett-Packard, 800/752-0900, $1279.** Primarily for those of you who use a PC or work in a small, mixed-platform environment, this energy-efficient laser printer offers automatic port and language switching, and is a good buy. Its advanced PC features may not be worthwhile for those who use Macs only. May 94

★★★★ **LaserWriter 5elect 300, Apple Computer, 408/996-1010, $839.** Inexpensive, low-capacity printer is networkable, and an excellent buy, despite a few weaknesses. Add a 4MB SIMM to take advantage of the amazing PhotoGrade capabilities, which allow the printer to generate 91 shades of gray. Aug 93

★★ **LaserWriter 5elect 310, Apple Computer, 408/996-1010, $1099.** This big, slow printer is a true Adobe PostScript printer with both Mac and DOS ports, but it's not networkable or compatible with the Communications Toolbox, it can't automatically switch ports, and it doesn't have adjustable paper guides. Aug 93

★★★ **LaserWriter Pro 600 and 630, Apple Computer, 408/996-1010, $2099 to $2529.** From their paper handling to their print quality, these laser printers are Apple's best. Unfortunately, they don't support emulation sensing, and thus may be less desirable for mixed-platform offices than other possibilities. Jun 93

★★★★★ **LaserWriter 5elect 360, Apple Computer, 408/996-1010, $1599.** Low-cost, high-performance, 10 ppm printer is perfect for small LocalTalk or mixed networks. For bigger networks, consider buying more than one; they're more cost-effective than a 20-ppm printer. Apr 94

★★★ **MobileWriterP5, Mannesmann Tally Corp., 206/251-5524, $999.** Fast, portable printer is currently the only PostScript portable available. While the print quality is quite good on glossy laser paper, it's mediocre on inexpensive bond. Dec 93

★★ **Notebook Printer II, Citizen America, 310/453-0614, $399.** If weight and size are your biggest concerns in choosing a portable printer, and you print primarily in black and white, this thermal-fusion printer may be a good choice. If speed is at all an issue, however, other options may be preferable. Jun 94

★★★★ **Personal LaserWriter 320, Apple**

Computer, 408/996-1010, $959. If you've been holding out for a high-quality personal laser printer that's fast enough to share over LocalTalk, the small inconveniences of this 300-dpi printer are easily outweighed by its low price, good speed, and PostScript Level 2 support. May 94

★★★ **Phaser 200i Color Printer, Tektronix, 503/682-7377, $5995.** This thermal-wax color printer is fast and compact, with versatile paper-handling features. TekColor image-enhancement technologies provide excellent output quality that is, however, poor on letterhead and inexpensive photocopier bond. Aug 93

★★ **PrintPartner 10W, Fujitsu Computer Products, 408/432-6333, $2450.** While this multiplatform printer is fast and prints clearly, many Mac users will find it frustrating as it can't print some TrueType fonts. Jul 93

★★★ **Silentwriter 640, NEC Technologies, 508/264-8000, $800.** With 3MB of RAM, PostScript Level 2 support, and a 6-ppm engine, this printer is a capable performer. Generally, it represents hassle-free printing, but it doesn't handle single sheets of paper well. Jun 94

★★★ **Smart Label Printer Pro, Seiko Instruments, 408/922-5900, $299.95.** If you need to print only a few labels at a time, this label printer may be an expensive but good choice. It prints very quickly, and with excellent print quality. May 94

★★★★ **StyleWriter II, Apple Computer, 408/996-1010, $359.** Apple's ink-jet printer retains the best features of its predecessor, but costs less. New features, such as gray-scale printing and the ability to share the printer over a network, make it even more versatile. Jun 93

SYSTEMS/STORAGE

★★★ **Centris 610, Apple Computer, 408/996-1010, 4/80 $1859.** Slim-design Mac uses a 20MHz 68LC040 processor at a price-to-performance ratio that comes close to competing with Windows PCs; however, its expandability is severely limited. Jun 93

★★★★ **Centris 650, Apple Computer, 408/996-1010, 4/80 68LC040 $2699.** Moderately priced but fast 040 system offers three expansion slots and one drive bay, and (except for the base model) has built-in Ethernet, video circuitry, and a math coprocessor. Jun 93

★★★★ **DataPak 105, Mass Microsystems, 408/522-1200, $949 to $1049.** Well-built 105MB SyQuest drive comes with a decent, no-frills cartridge-formatting package and a copy of 7th Heaven. The preformatted cartridges have a lifetime warranty. Sep 93

★★ **DOS Compatible Card, Apple Computer, 408/996-1010, $399.** If you want to integrate a PC into your Macintosh, this card will let you—if you have a Centris or Quadra 610, don't need network support, and don't intend to upgrade to a Power Mac. All in all, it's pretty limited. Jun 94

★★★ **EtherDock, E-Machines, 408/541-6100, $699.** Heavy-duty Duo docking option is equipped with a full set of 11 ports, including an Ethernet port. The locking mechanism is alarmingly wobbly—although reliable enough to ensure a good connection May 94

★★★ **Expert Pad PI-7000, Sharp Electronics Corp., 800/993-9737, $899.** Personal digital assistant features the advantages of the Newton, in a better industrial design and at a comparative price. If the battery lasted longer and the message network were implemented, the PDA revolution could begin. Feb 94

★★ **HP Optical Disk Library 10LC, Hewlett-Packard, 800/752-0900, $9495.** Optical jukebox may fill the need for 10 gigabytes of online storage, but its performance is poor, and the software lacks the features needed for adequate management. Jan 94

★★★★ **Infinity 105 Turbo, Peripheral Land, 510/657-2211, $795 to $894.** Small, light, quiet, inexpensive 105MB SyQuest drive is ingeniously packaged and ideal for both desktop and PowerBook use. Sep 93

★★★★ **LC III, Apple Computer, 408/996-1010, 4/80 $1349.** Base system comes equipped with a 25MHz 68030 processor and 512K of VRAM. This is a machine that fits the bill and the pocketbook of most home users and small-business owners. Jul 93

★★★★ **LC 575, Apple Computer, 408/996-1010, $1699.** For students and small-business professionals who want high power and the convenience of having everything integrated into one case, this 33MHz 68040 system is an ideal choice. Jun 94

★★★★ **MultiDisk 150, Iomega, 801/778-1000, $699.** Durable cartridges are one of the strongest reasons to choose this Bernoulli removable drive. Although it's slightly more expensive than a SyQuest drive, the drive is fast and reliable, and the disks are competitively priced. Jun 93

★ **NuTek Duet, NuTek USA Corp., 408/973-8799, $2996.** Mac workalike is both a PC and a Mac in a single box, but because of many incompatibilities and problems, the Duet is not a computer anyone should consider using for serious work. Feb 94

★★★ **OrangePC, Orange Micro, 714/779-2772, $1799.** NuBus board has a DOS processor, letting you have your Mac and a PC, too. It's fairly well executed, though there are some minor problems. Oct 93

★★★ **PLI 2.4 GB MiniArray, PLI, 510/657-2211, $4815.** Slick and elegant RAID drive worked beautifully in tests, but it costs more than other options and the QuickSCSI board is sensitive to minor SCSI problems. Apr 94

★★★★ **PowerBook 140 F/25 Upgrade, Digital Eclipse Software, 510/547-6101, $399.** By changing the oscillators and adding an FPU, Digital Eclipse changes PowerBook 140s into 170s, minus the active matrix screen. While the upgrade seems expensive, it's the only way to extend the viability of a 140. Dec 93

★★ **PowerBook 165c, Apple Computer, 408/996-1010, 4/80 $3399.** The passive matrix screen of this color notebook computer is dull and has noticeable afterimages, but if your expectations are reasonable, the speedy processor provides a pleasant work environment. Jul 93

★★ **PowerBook 180c, Apple Computer, 408/996-1010, 4/80 $4169.** The active matrix screen of this color notebook computer is beautiful but so small that its usefulness is very limited. Sep 93

★★★★ **PowerBook Duo 270c, Apple Computer, 408/996-1010, 4/240 $3099.** Notebook computer meets all the demands of power users; it weighs less than five pounds, features a color active matrix display, and offers longer battery life. The lack of a floppy drive can be inconvenient, though. Feb 94

★★★★ **Power Macintosh 6100/60, Apple Computer, 408/996-1010, base model $1819.** Given its price and performance, this Power Macintosh is hard to resist. When developers offer in PowerPC format the software that most business users run daily, this should be a system that will give you power to spare. Jun 94

★★★★ **Quadra 605, Apple Computer, 408/996-1010, 4/80 $979.** Never before has Apple offered so much performance for so little money. The performance and price of this 040-based machine match those of a standard entry-level 486SX-based Windows PC. Mar 94

★★★★ **Quadra 800, Apple Computer, 408/996-1010, 8/230 $4679.** Squat, yet curvy and attractive, this minitower system has fewer expansion opportunities than the Quadra 950, but just as much power. It's fast, slick, and moderately priced. Aug 93

★★★★ **Quadra 840AV, Apple Computer, 408/996-1010, 8/230 $4069.** Technological tour de force uses a 40MHz 68040 and an AT&T 3210 digital signal processor, and is brimming with sophisticated speech-recognition and audiovisual technology. Beware of some hardware and software incompatibilities. Dec 93

★★★ **SCSI MicroDock, Newer Technology, 316/685-4904, $175.** Tiny PowerBook Duo docking station is just under 4½ ounces and barely 5 inches long. It adds only an ADB port and a SCSI port—but both are useful. May 94

★★★★ **SledgeHammer2000FMF, FWB, 415/474-8055, $3179.** RAID drive is both fast and inexpensive. Although it can be a bit noisy when accessing data, it's a good deal. Apr 94

★★★ **SmartStack, Envisio, 612/628-6288, SmartSource $119; SmartModules $289 to $1379.** The SmartStack line of modular storage peripherals may be neatly stacked on top of a common power supply to reduce desktop clutter and cabling problems. Sep 93

★★★ **Turbo 040, DayStar Digital, 404/967-2077, $1899.** This accelerator card is equipped with the fastest 68040 chip available, and is as fast as or faster than any Macintosh in processor-intensive tasks. For the price, however, it may make more sense to trade up to a faster computer. Dec 93

VIDEO/DISPLAY

★★★ **AudioVision 14 Display, Apple Computer, 408/996-1010, $769.** Monitor integrates audio and video with built-in speakers that produce surprisingly rich, full-bodied sound. The display, while nice, is small for multimedia work. Dec 93

★★★ **Dycam Model 3, Dycam, 818/998-8008, $895.** Low-end, digital still camera is easy to use, and is a solid product if Instamatic grade gray-scale meets your image-quality requirements. Sep 93

★★★ **Editing Aces Suite, RasterOps, 801/785-5750, $3899.** Video professionals can record and play back full-screen movies in 24-bit color with 16-bit CD-quality sound with these products. Despite some flaws, this package represents a step forward in QuickTime technology. Nov 93

★★★ **Intellicolor Display/20, Radius, 408/434-1010, $3199.** Although with its exceptional brightness and clarity this monitor would be a fine addition to any designer's desk, the included Intellicolor software, which lets you control the settings of your display, doesn't offer much added value. Apr 94

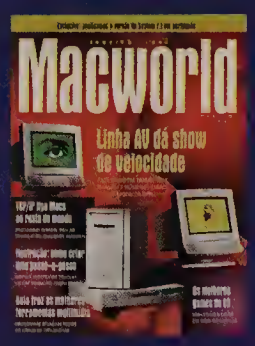
★★★★ **MovieMovie, Sigma Designs, 510/770-0100, $349.** This 7-inch NuBus video-capture board may be what you've been waiting for. The price is right, and the addition of on-board audio input is a plus, even if it is only mono. Dec 93

★★★ **PaintBoard Turbo, RasterOps, 408/562-4200, $1499.** Midrange video board supports 24-bit color on monitors up to 17 inches and resolutions as high as 1024 by 768 pixels. If you can live without changing resolutions on the fly, it's a reasonably good deal Oct 93

★★★ **VideoToolkit 2.0.1, Abbate Video, 508/376-3712, $279.** Despite a few rough edges, this is an attractive, inexpensive solution for those who need to catalog and edit videotapes on a budget Sep 93



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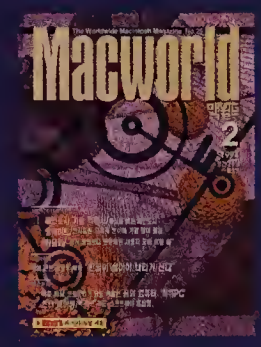
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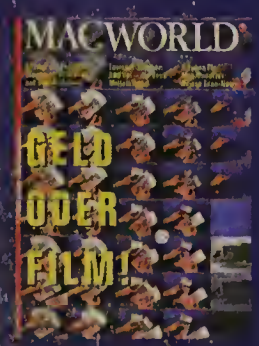
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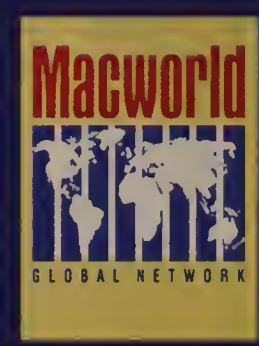
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Streetwise Shopper

SPECIAL HARDWARE AND SOFTWARE BUYING OPPORTUNITIES

Selected and edited by Charles Barrett

The following listings represent special promotions being sponsored by Macintosh vendors and their resellers. Each listing indicates which products have been awarded a star rating in *Macworld*'s *Reviews* (products rated ★★ or lower are not eligible for inclusion), have been selected as an Editors' Choice, or have won a World-Class award. In some cases, the editorial evaluation quoted is for an earlier product version. The ◀ symbol indicates that the product is Power Mac related.

When placing an order, please mention that you saw the offer in *Macworld*. Should any problems arise, contact the *Streetwise Shopper* editor by fax (415/442-0766), phone (415/978-3241), or mail (*Macworld*, 501 Second St., San Francisco, CA 94107).

Vendors and resellers desiring to have products and services included in this section are encouraged to contact the *Streetwise Shopper* editor with particulars.

BUNDLES

Collage 1.0.1 + Adobe Photoshop 2.51 Specular International is bundling its $349 Collage image-compositing software (Jul 94 ★★★) with Adobe's $895 color-image editor (Jun 93 ★★★★ for version 2.5; 1993 World-Class) for $699. Available through MacWarehouse (800/255-6227). *Offer not to expire before 7/31/94.*

DayStar Turbo 040 + Secondary Cache DayStar Digital is now offering its 33MHz and 40MHz Turbo 040 and 040i accelerator boards bundled with a 128K high-speed static RAM cache for $949, $1149, and $749. This represents a $100 savings over purchasing a board and FastCache Turbo separately. Call 800/962-2077 for more information.

Epson ES-800C-ProMAC + Astound 1.0 + $50 Rebate Epson is including a free copy of Gold Disk's $399 Astound multimedia application (Nov 93 ★★★★) and offering a $50 rebate with the purchase of this $1649 24-bit color scanner (see Nov 93 "Low-Cost Color Scanners"). Rebate forms available at point of purchase, or call 800/289-3776. *Offers expire 7/31/94.*

Infini-D 2.6 + Adobe Premiere 3.0 Specular International is bundling its $695 3-D design application (Jan 93 ★★★★ for version 2.0) with Adobe's $695 QuickTime video-editing software (Jan 93 ★★★★ for version 2.0) for $679. Available through MacWarehouse (800/255-6227). *Offer not to expire before 7/31/94.*

Macintosh Quadra 605 + 8 applications Apple Computer is now including the following preinstalled applications with its Quadra 605 systems (Mar 94 ★★★★): Claris's $299 ClarisWorks 2.0 integrated software (Aug 93 ★★★★); Intuit's $69.95 Quicken 4 personal-finance package (Nov 93 ★★★★); ASD Software's $149 FileDuo 1.02 backup software; Gold Disk's $399 Astound 1.0 multimedia application (Nov 93 ★★★★); No Hands Software's $189.95 Common Ground 1.1 electronic-document-distribution program (Oct 93 ★★★★ for version 1.0); FIT Software's $169 Full Contact personal information manager; Working Software's $49.95 Working Watermarker 1.02 printing utility (Jan 94 ★★★); and SoftKey International's $59.95 American Heritage Electronic Dictionary, Third Edition. This bundle does not include master disks for the installed applications. In addition, the price of the Quadra 605 8/160 has been reduced by 16%, to $1069. Call 800/538-9696 for reseller information.

PageMaker 5.0 + Ofoto 2.03 Customers who order either Aldus's complete $895 PageMaker 5.0 desktop publishing program (Nov 93 ★★★★) for $579, or the 5.0 upgrade for $199, can also buy Light Source's $395 Ofoto scanning software (Jul 93 ★★★ for version 2.0; 1993 World-Class) from MacWarehouse for $99. Call 800/255-6227 to order. *Offer not to expire before 7/31/94.*

PowerPlate Battery System + CPU 2.0 Technöggin is now including a free copy of Connectix Corporation's $99 CPU Power8ook utility (Sep 93 ★★★★) with its PowerPlate line of external PowerBook battery systems priced as follows: the Mini 3 for $169.95; the 3x for $239.95; and double-capacity 5x for $299.95. For more information, call 800/305-7936.

Professor Office Individual Software has combined a $69.95 Microsoft Word 5.1 tutorial and a $69.95 Microsoft Excel 4 tutorial, together with a bonus copy of its $29.95 Learn to Use Mac tutor, into a $49.95 suite of interactive computer-based training solutions for boosting productivity—particularly for Microsoft Office users. Available through resellers for under $30. Call 800/822-3522 for further information.

◀ **RISC Workgroup Server + GraceLAN Server Manager 3.0** Apple Computer is providing a complimentary copy of TechWorks' $395 GraceLAN Server Manager to customers who purchase any one of its three new PowerPC processor–based Workgroup Servers—the 6150 for $4219, the 8150 for $7459, or the 9150 for $9229—and return the registration card. *Offer not to expire before 12/31/94.*

SunPack PB + CPU 2.0 Keep It Simple Software is offering Connectix Corporation's $99 CPU Power8ook utility (Sep 93 ★★★★) for $49 when customers purchase its $229 portable solar panel for $189. The SunPack can supplement the battery of a running Power8ook, as well as recharge nickel-cadmium power packs. Call 800/327-6882 for more information and to order.

SIDEGRADES/UPGRADES

Hard Disk ToolKit 1.5.1 FW8 is offering this $199 hard-drive–management utility (Jan 93 ★★★ for version 1.1.2 of the $79 Personal Edition) for $99 to owners of any non-Apple formatting utility. Available direct (415/474-8055) or through MacConnection (800/800-2222).

◀ **QuarkXPress 3.3** Quark is offering a $999 PowerPC upgrade of this desktop publishing system (Nov 93 ★★★★ for version 3.2; 1993 World-Class) at the introductory price of $199 until October, and for $229 from then through December. For more information, call 800/788-7835. *Offers expire 10/1/94 and 12/31/94.*

Virex 5.0 Datawatch Corporation is offering this $99.95 antivirus utility (Jul 94 "Virus Killers" Editors' Choice; May 94 ★★★★) for $39.95 to users of Symantec AntiVirus for Macintosh (SAM) or Central Point Software's MacTools. Call MacWarehouse (800/225-6227) or Datawatch (919/549-0711) for qualification requirements and to order. *Offer expiration extended to 8/31/94.*

SPECIAL DISCOUNTS/REBATES/OFFERS

Apple Exchange Program Apple Computer, through remarketer Micro Exchange, is offering trade-in dollars, which must be applied against the purchase of new Apple equipment, to owners of virtually any name-brand CPU, printer, or monitor. 8ased on a trade-in pricing schedule, resellers provide customers with a firm price quote within 24 hours, good for 30 days. If Micro Exchange does not revise the price quote when it evaluates the old equipment, Micro issues a check directly to the customer within ten days. Call 800/538-9696 for reseller information.

Colorize Jr. DS Design is offering a special introductory price of $79 on this $99 utility for coloring black-and-white TIFF line drawings, clip art, illustrations, and scans. Colorize Jr. automatically traps colors as you paint. Offer includes the option to upgrade to DS Design's $399 Colorize 2.0—a full version that includes the ability to do gradations, blends, and airbrush effects—for $299. Call 800/745-4037 for more information and to order. *Offer expires 7/31/94.*

Medieval & Renaissance Clip Art Library Canned Art Connection is offering 88L Typographic's $250 collection (Volumes 1 through 6) of 437 ornaments and decorative alphabets from the 14th, 15th, and 16th centuries for $195. Call 800/455-4278 for further details and to order. *Offer expires 7/31/94.*

PortfolioMaker 1.2 Crit is offering a special introductory price of $79 (plus $7.95 S&H) on this $129 program that makes it possible to create an electronic portfolio of up to twenty 24-bit color images with text on a single floppy disk. The program includes a floating palette of authoring tools that is deleted once an electronic portfolio is completed and locked. Call 800/410-2748 to order. *Offer not to expire before 7/31/94.*

XpressServe Emerald Systems is offering this $795 network-file-server–based backup software for Novell NetWare LANs at the special introductory price of $595. Call 800/767-2587 for more information. *Offer expires 6/30/94* m

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CAPACITY	SIZE	ACCESS	INTERNAL	EXTERNAL
240MB*	2.5"	14MS	$ 375	$ 435
530MB	3.5"	9MS	$ 465	$ 525
1.2GIG	3.5"	8.5MS	$ 825	$ 885

Seagate — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS		EXTERNAL
1.2GIG	3.5"	9MS	ST31200N	$ 899
2.4GIG	3.5"	9MS	ST12400N	$ 1555
2.5GIG	3.5"	8MS	Barracuda 2	$ 1855
2.5GIG	3.5"	8MS	WIDE	CALL
3.4GIG	5.25"	10MS	Elite 3	$ 2195
9.0GIG	5.25"	11MS	Elite 9	$ 4995

CONNER — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS		EXTERNAL
545MB**	3.5"	12MS	CFA540S	$ 490
1.0GIG	3.5"	9MS	CFP1060S	$ 815

Quantum — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS		EXTERNAL
1.0GIG	3.5"	9MS	E1080S	$ 815
22GIG	3.5"	9.5MS	E2160S	$ 1359

HITACHI — 5 YEAR WARRANTY

CAPACITY	SIZE	ACCESS	INTERNAL	EXTERNAL
3.7GIG	5.25"	12.8 MS	$ 1845	$ 1945

MONITORS

Sony	GDM-17SE1	1159
Sony	GDM-2036S	1999
Sony	GDM-2038S	2189
RasterOps	Horizon 24	2259
RasterOps	Paintbd Turbo	1159
RasterOps	8XL	459
RasterOps	8Li	339

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CAPACITY	MODEL	ACCESS	EXTERNAL
128MB	Fujitsu	30MS	$ 765
230MB	Fujitsu	30MS	$ call
650MB	Ricoh Hyperspace	28MS	$ 1799
1.3GIG	Ricoh	40MS	$ 2459
1.3GIG	Sony	40MS	$ 2299
2.0GIG	Hitachi	40MS	$ 2799

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525mb	Tandberg TDC 3820	DC6250	$ 565	$ 625
1.3-2GIG	Archive 4320*	4MM	$ 839	$ 899
1.3-8GIG	Archive Turbo*	4MM	$ 1039	$ 1099
1.3-5GIG	Exabyte 8205	8MM	$ 1539	$ 1599
1.3-10GIG	Exabyte 8505	8MM	$ 2179	$ 2279
4.0-8GIG	Sony 4000	4MM	$ 1089	$ 1149
4.0-8GIG	Sony 5000 DDS-2	4MM	$ 1189	$ 1249

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120M	Tape	$ 22	2.0GIG	Optical	$ 120

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Macworld

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For faster results just fax this sheet to +1-413-637-4343. Please indicate your fax number where indicated.

Please answer these questions so that we may better serve you.

A. Including yourself, approximately how many people are employed at your entire work-site (i.e., employees in your office, building, or cluster of buildings)? (Check one.)

- 01 ❑ 1000+
- 02 ❑ 999 - 100
- 03 ❑ 99 - 25
- 04 ❑ Under 25

B. Which of the following computers are installed at this entire work-site? (Check all that apply.)

- 05 ❑ Apple Workgroup Servers/ Mac Quadra-series
- 06 ❑ Mac Centris-series/II-series/LC III/ Performa 600/450/SE 30
- 07 ❑ Mac LC/LC II/Performa 430/405/ 400/200/Classic-series/SE/Plus/ 512K/128K/Portable
- 08 ❑ Mac PowerBook-series/Duo-series

C. What is the total number of Macs installed at this entire work-site? (Check one.)

D. For how many Macintosh computers within this entire work-site do you have purchase involvement for products and/ or services? (Check one.)

	C	D
500+	❑ 09	❑ 15
499 - 100	❑ 10	❑ 16
99 - 50	❑ 11	❑ 17
49 - 10	❑ 12	❑ 18
9 - 1	❑ 13	❑ 19
None	❑ 14	❑ 20

E. In which ways are you ever involved in purchase decisions for Macintosh products at this entire work-site? (Check all that apply.)

- 21 ❑ Initiate/Determine need for product/capabilities/features
- 22 ❑ Evaluate, recommend, or approve brands/models
- 23 ❑ Evaluate, recommend, or approve purchase source
- 24 ❑ Authorize purchases

F. Over the next 12 months, how much will this entire work-site spend on Macintosh products and/or services? (Check one.)

- 25 ❑ $1 million or more
- 26 ❑ $999,999 – $500,000
- 27 ❑ $499,999 – $100,000
- 28 ❑ $99,999 – $50,000
- 29 ❑ $49,999 – $10,000
- 30 ❑ Under $10,000

G. Considering the entire work-site, which of the following Macintosh hardware and software products are currently installed? (Check all that apply.)

- 31 ❑ Business software (Word processing, spreadsheet, database, etc.)
- 32 ❑ Graphics/publishing software
- 33 ❑ Monitors/displays
- 34 ❑ Printers/scanners
- 35 ❑ Networking/communications hardware and/or software
- 36 ❑ Multimedia/AV hardware and/or software
- 37 ❑ Mobile computing products (PowerBooks, peripherals, software, etc.)

H. What is your primary job function? (Check one.)

- 38 ❑ Computer Reseller/VAR/VAD
- 39 ❑ MIS/DP/IS/Network Management
- 40 ❑ Engineering
- 41 ❑ R&D/Scientific
- 42 ❑ Corporate/General Management
- 43 ❑ Accounting/Finance
- 44 ❑ Marketing/Sales/PR/ Communications
- 45 ❑ Art/Design/Creative Services

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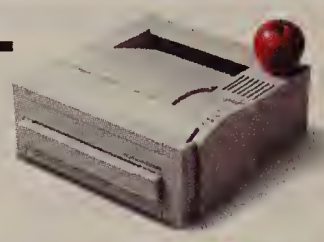
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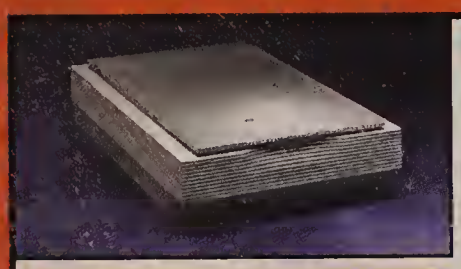
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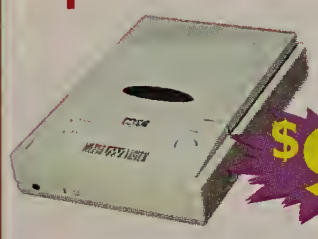
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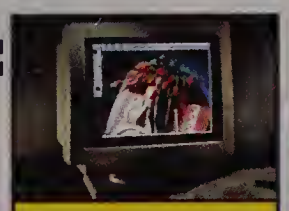
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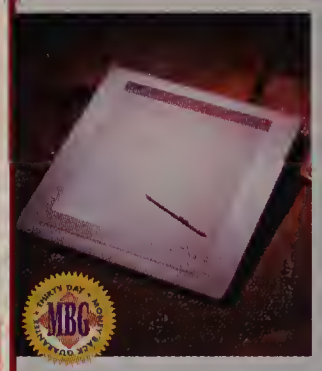
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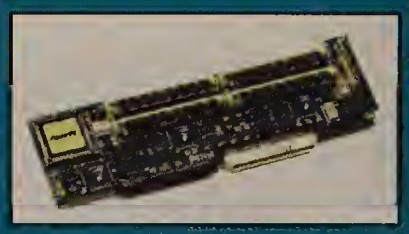


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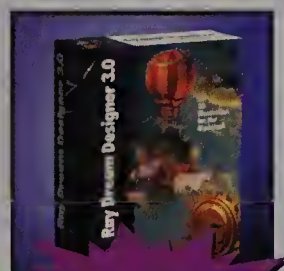
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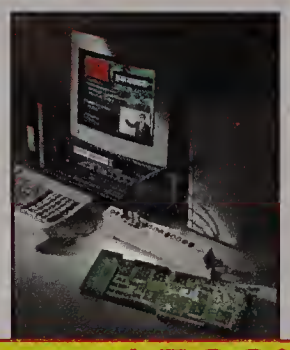
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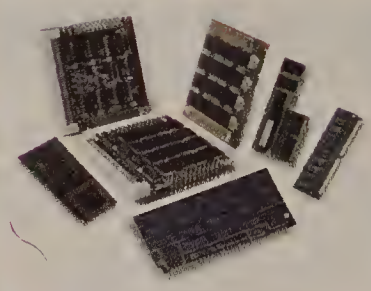
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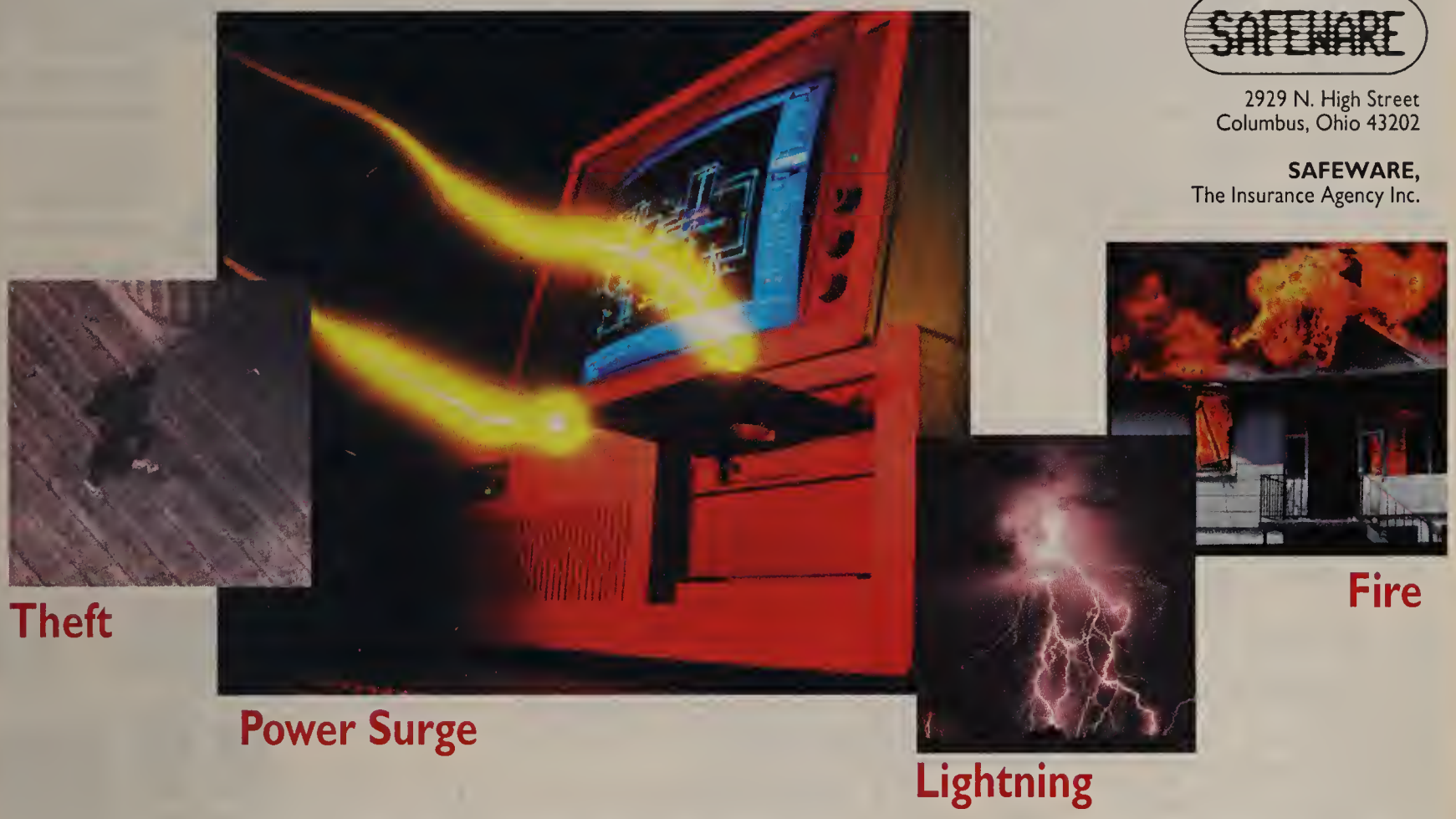
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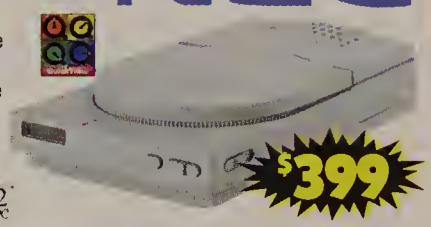
44mb (SQ400)	$5
88mb (SQ800)	$8
105mb (SQ310)	$5
200mb (SQ2000)	$9
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The 3Xp combines 3X transfer rate performonce, 250ms access time and a 256 KB continuous-flow cache in a compact design, making it and incredible value. At only 2.4 lbs the 3Xp is the world's lightest triple speed CD-ROM reoder.

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PhotoCD MultiSpin CD-ROM READER PC2 Multimedia PC

NEC CD-ROM READERS

	w/o bundle	w/bundle
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MultiSpin 3Xp (Portable, 250ms access time)	$399	$499
MultiSpin 4X Pro (External, 180ms access time)	$935	$1035

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NO CADDY NEEDED!



- 320ms access time
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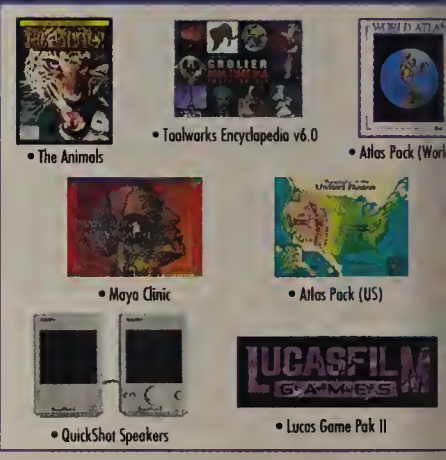
PhotoCD™

ClubMac 30 DAY MONEY BACK GUARANTEE

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Quantum

LPS 540MB



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3.5" HALF HEIGHT

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Seagate

ClubMac 30 DAY MONEY BACK GUARANTEE

Seagate drives carry a ONE Year Warranty

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
3.5" LOW PROFILE						
1.2GIG	ST31200N		10ms	1000mb	$869	$929
3.5" HALF HEIGHT						
1.9GIG	ST11900N		9ms	1600mb	$1199	$1259
2.4GIG	ST12400N		9ms	2000mb	$1549	$1609
1.9GIG	ST11950N	*Barracuda 1*	8ms	1350mb	$1489	$1549
2.4GIG	ST12550N	*Barracuda 2*	8ms	2050mb	$1745	$1805
5.25" FULL HEIGHT						
3.4GIG	ST43400N	*Elite-3*	11ms	2750mb	$2159	$2259

ClubMac Tape Backup

Capacity	Model	Format	Media	Internal	Extern
2.0GIG	ClubMac DAT	DDS	60m, 90m	$749	$79
2-4GIG	ClubMac DAT/DC	DDS-DC	60m, 90m	$949	$99
4-8GIG	ClubMac DAT/2	DDS-2	60m, 90m, 120m	$1329	$137
2.0GIG	HP DAT	DDS	60m, 90m	$949	$99
2-4GIG	HP DAT/DC	DDS-DC	60m, 90m	$1109	$115
4-8GIG	HP DAT/2	DDS-2	60m, 90m, 120m	$1439	$148

ClubMac OAT and OAT/DC drives include Retrospect v2.0 Backup Software, ONE 90 Meter Tape and a TWO Year Warranty. HP OAT drives carry a ONE Year Warr
The ClubMac OAT/2 & HP OAT/2 drive includes Retrospect Remote v2.0 (3-Pack) Network Backup Software, ONE 120 Meter Tape and a ONE Year Warranty

ClubMac Optical Drives



CLUBMAC 5.25" 1.3GIG SHARP OPTICAL

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CLUBMAC 5.25" 650MB SHARP OPTICAL

		Access Time	Internal	Extern
ClubMac (M25IIA) 3.5" 128mb Fujitsu Optical	ClubMac 30 DAY MONEY BACK GUARANTEE	40ms	$839	$86
Fujitsu (M25IIA-DYNAMO) 3.5" 128mb Dynama		40ms		$86
ClubMac (OMD-5010) 3.5" 128mb Epson Optical	MW	40ms	$759	$78
ClubMac (JY-750) 5.25" 650mb Sharp Optical	MW	40ms	$1669	$169
ClubMac (JY-800) 5.25" 1.3GIG Sharp Optical		40ms	$2469	$249
Tahiti III (9400) 5.25" 1.3GIG Optical		19ms		$274
ClubMac HP (C1716T) 5.25" 1.3GIG Optical External		28ms		$269

All ClubMac Opticals include ONE cartridge and ONE Year Warranty.

CLUBMAC 20" TRINITRON MONITOR BLOWOUT

Monitors & Graphic Cards

radius

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MansGT (0447)	$1949
ecisianColor Pro 24X (0429)	$1349
ecisianCalar Pra 24XK (0430)	$699*
ecisionColor Pro 24XP (0431)	$449
ecisianCalar 24X (0421)	$824†

MULTIMEDIA

deaVision Studia (0418)	$3389
deoVision Studia Upgrade (0419)	$1499
deaVision Studia Basic (0416)	$1549

MONITORS

ecisianCalar/21 (0463)	$2049
telliColar Display/20 (0381)	$1879
ecisianColar Display/20v (0427)	$1679
ecisianCalar Display/17 (0460)	$999**
ecisianColor Pivot (0356)	$649
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ull Page Display/gs (0424)	$489
PD20gs (0436)/21gs (0437)	$799/$989

†After MFR $50.00 rebate, *After MFR $75.00 rebate
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IntelliColor Display / 20

ClubMac Blowout Price is... $1879

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PrecisionColor Pro 24X

or



$1949

LeMansGT

NEC MultiSpin 3Xe

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+

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$1429

You also get Free DSP upgrade $599 value

Bundle:

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+
$1429 Thunder/24
$3378
- $200 SUPERMAC REBATE
$3178

Offer ends 8/31/94

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Thunder/24 v.2.0 (G1130)	$1429
Thunder II GX•1600 1600 x 1200	$3349
Thunder II GX•1360 1360 x 1024	$2689
Thunder II GX•1152 1152 x 870	$2169
Spectrum Power • 1152 (G3430)	$1169
Spectrum/24 Series V (G3930)	$839

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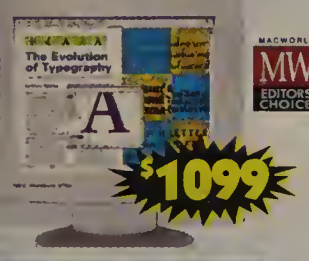
SuperMotch 21•TXL Trinitron (ST02102)	$2199
SuperMatch 20•TXL Trinitron (STD9752-XL)	$1949
SuperMatch 17XL (STD1701)	$999
Plotinum 21 Two-Page GS (STD9761)	$999
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Spigat II Tape (0V1530)	$849
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Video Spigat LC (0V1050)	$249

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21" MultiSync 6FGp (JC-2141UMA-3) up to 1280 x 1024	$1999

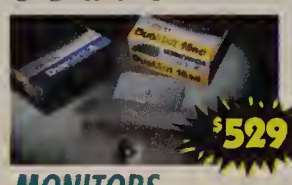
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The Silentwriter 640 carries a Limited TWO-Year Overnight Replacement Warranty
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MoviePak2 (2676)	$1479
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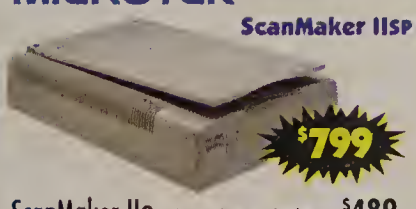
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HP DeskWriter 310 Optional Color Kit Available	$299
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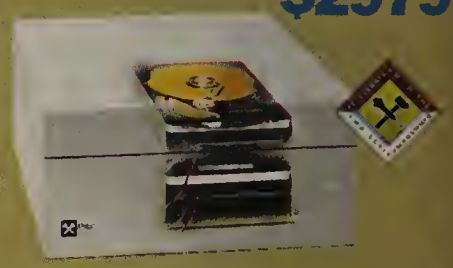


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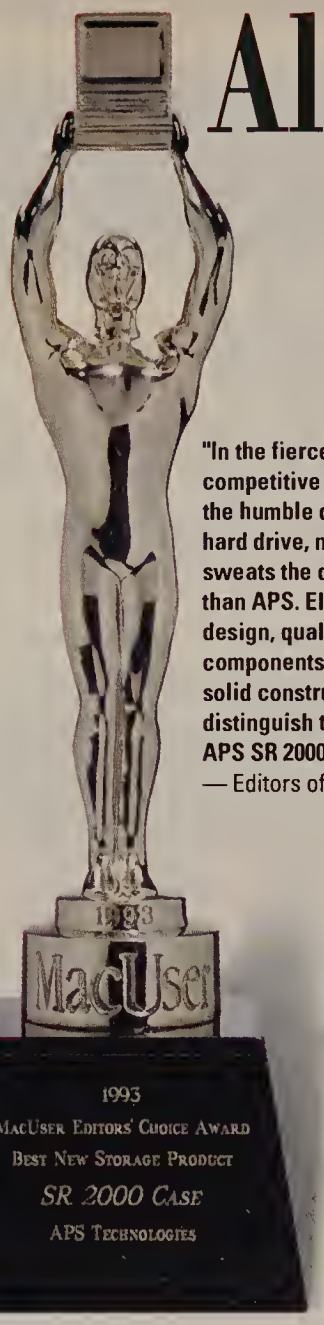
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SR 2000 StackKIT™ $24

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- StackKIT Includes Four Concave Stacking Feet
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SCSI Sentry™

Now you can "stop SCSI Voodoo" on your SCSI Chain, even when you're not ready to buy a new drive. Our new SCSI Sentry™ gives you all the benefits of APS' acclaimed DATerm technology in the form of an external SCSI performance monitoring instrument.

Benefits	SCSI Sentry
Optimizes Overall SCSI Performance	✓
Exclusive Digital Active Termination	✓
Provides Ideal Termination Power	✓
Drastically Reduces SCSI Retries	✓
Regulates SCSI Line Voltage	✓
Solves Bus Impedance Issues	✓
LED Activity Indicators Diagnostic Tool	✓
Easy Installation: Takes Seconds	✓

APS HARD DRIVES For your Mac or Power Mac

Model	Capacity	Internal	SR2000
163MB - 1029MB			
APS Q 170[2] Quantum 170 LPS mechanism	163MB	199	289
APS Q 270[2] Quantum LPS270 mechanism	257MB	359	449
APS MX 290[2] Maxtor 7290 mechanism	276MB	299	389
APS MX 345[2] Maxtor 7345 mechanism	324MB	339	429
APS 340[2] 340 mechanism	327MB	429	519
APS Q 540[2] Quantum 540 mechanism	516MB	399	499
APS MS1.2AV[5] Micropolis 2210AV mechanism	965MB	949	1039
APS MS1.2[5] Micropolis 2210 mechanism	1001MB	899	989
APS MS4110[5] Micropolis 2210 mechanism	1002MB	889	979
APS Q 1080[2] Quantum 1080S mechanism	1029MB	749	849

Model	Capacity	Internal	SR2000
1611MB - 2845MB			
APS ST 1.6[5] Seagate ST11950 Barracuda mech.	1611MB	$1499	$1589
APS MS 1.7AV[5] Micropolis 2217AV mechanism	1612MB	1279	1369
APS MS 1.7[5] Micropolis 2217S mechanism	1682MB	1199	1289
APS ST 2.0[5] Seagate ST 125500N Barracuda mech.	2040MB	1799	1889
APS MS 2.4G[5] Micropolis 1926 mechanism	2100MB	1499	⚜1599
APS MS 3.0G[5] Micropolis 1936 mechanism	2845MB	2149	⚜2249

1-5 *Denotes length of manufacturer's warranty*
⚜ *External Case is Special Full Height Only*

POWERBOOK DRIVES

Model	Capacity	LW Pro 630	Internal	Companion II AC/DC
APS PB 85[1]	80MB	$249	—	—
APS PB 170[1]	160MB	349	$299	$439
APS T 213[1]	202MB	349	299	439
APS PB 250[1]	240MB	449	399	539
APS T 340[1]	324MB	579	529	669
APS T 520[1]	500MB	949	899	1039

Internal drives for Quadra 800 and Centris 610 available.
DATerm patent pending
** Internal Price Listing*
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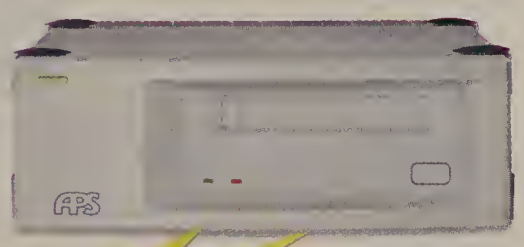
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APS DAT $799



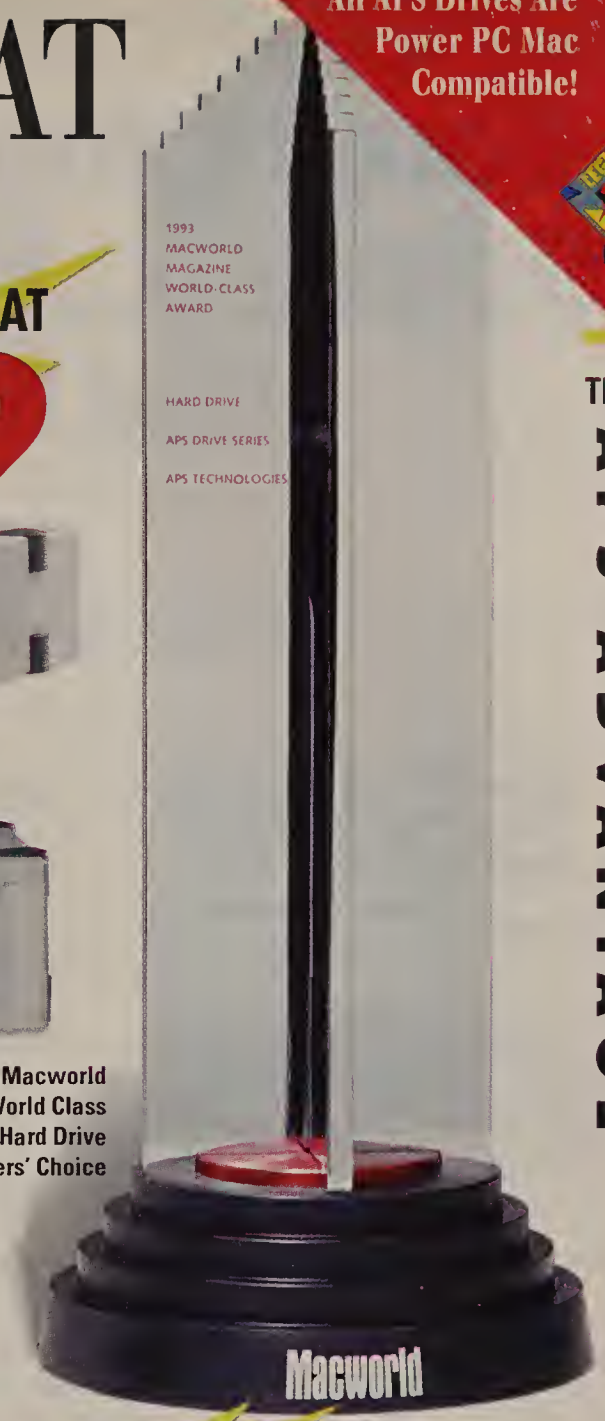
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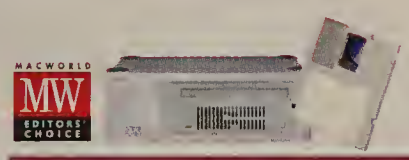


DAT

Model	Capacity*	Internal	SR 2000
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APS Turbo DAT[2]	4-5G on 90m tape	1149	1199
APS HyperDAT[1]	8-10G on 120m tape	1349	1399

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Model	SR 2000
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APS T 3401[1]	499

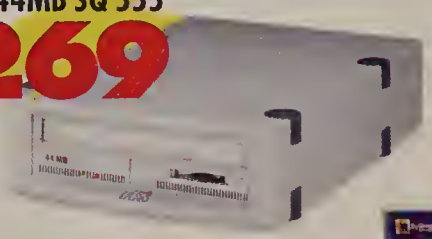
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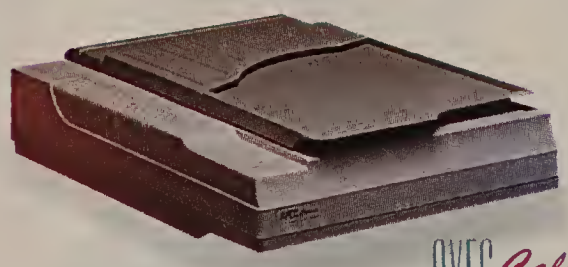
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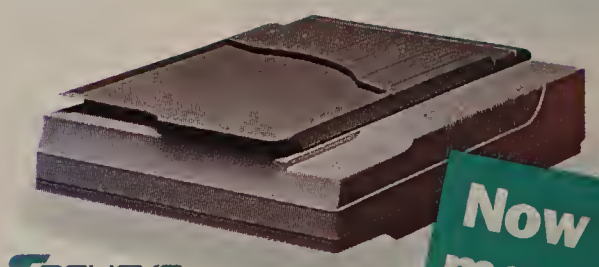


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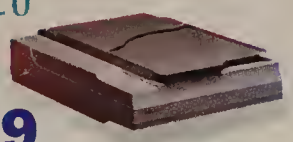


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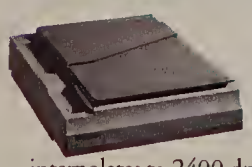


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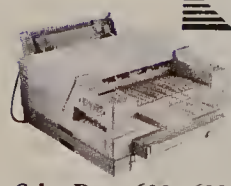
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Quantum LPS	240	270	340	525
Quantum PRO	700	1225	1800	
Empire	540	1080		
Seagate	1200	2500	3400	9.0
Barracuda	1900	2500	5000	
SyQuest	44	88	200	270
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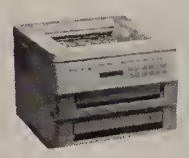
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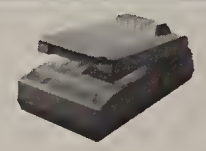
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Microtek IISP Scanmaker	$729.00
Microtek 35T	$1349.00
HP ScanJet IICX	$939.00
Tamarak 1200	$1,564.00
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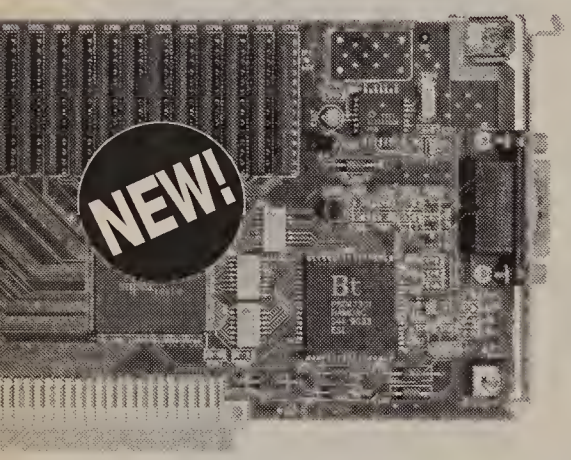
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- Multiple resolution switching 'on the fly'

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Radius Universal 24XK	$599	$750
VideoVision	$1299	$1428

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•Similar to PowerView but also does TV!

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Allows most PowerBooks and the Classic II to support color, grayscale, monochrome displays and projectors.

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	YOUR PRICE	DEALER COST
Radius Color Pivot LE (see above)	$399	$860
E-Machines ColorPage 15	$499	$1307

•15" full page color display •35% larger image area •Flat tension mask screen

Radius Grayscale Pivot	$499	$535

•Portrait and landscape orientations •Grayscale •Built-in video compatible

Full Page Display	$399	$530

•640 x B70 resolution •75 Hz refresh •Grayscale •Built-in video compatible

Radius Color Display/21	$1899	$1989

•Compatible with Centris or Quadra built in video (16 bit on Quadra 950)
•1152 x B70 resolution •True WYSIWIG mode

Precision Color Display/19	$1499	$1749

•Compatible with Centris or Quadra built in video (16 bit on Quadra 950)
•Multiple resolution switching 'on the fly'

Precision Color Display/19 with 24 bit video card	$2298	$1749
Sony 20 inch Trinitron	$1899	$2065
Radius 21 inch Grayscale	$899	$978

•Grayscale •Compatible w/ Centris or Quadra built in video

RasterOps 20 inch Display	$1399	$1446
RasterOps 20 inch Trinitron	$1899	$2209

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RADIUS ROCKET 68040 FROM $599

•68040 processor •Supports up to 128 MB of standard RAM in 8 SIMM slots •QuickDraw acceleration w/Radius boards

	YOUR PRICE	DEALER COST
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Quadra B40AV, 900, 950, B00, 700	CALL
PowerBook 170 B/B0 (active matrix)	1799
PowerBook 140 4/40	999
All other CPUs	CALL

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Quadra 900 to 950	999
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Mac II FDHD upgrade	399

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Apple Token Talk 1/4-4/16	399/599
DCA Mac Irma 3270	499
DCA Mac Irma 3270 for SE30	499
Ethernet boards for SE/SE 30	99
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Shiva FastPath 4 Gateway	999

CARDS- Misc.

B&W TV card for Nubus	199
Apple IIe Emulation for LC	149
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TrueVision NuVista+ 2MB	1999

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Apple B.24 GC	599
Apple B.24	399
Apple B bit for 13-14"	199
Apple Portrait/Two Page	149/249
E-Machines Colorlink EX/T	299
E-Machines Futura SX	349
E-Machines T19 card for SE30/IIsi	299
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RasterOps BLC card for LC	199
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RasterOps 24 L	1299
RasterOps Editing Aces	2999
RasterOps 24 KXL TV	2399
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Apple 5.25 External PC Drive	49
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Maxtor B00MB WORM Drive	999
Ricoh HyperSpace 600MB Optical	1999

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Lotus 123	B9
4D 1.06/3.0	399/549
AppleShare File Server 2.0	449
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MONITORS

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Apple 15" FPD Mono/Gray Scale	449
Apple 21" TPD Mono/Gray Scale	999
E-Machine ColorPage15 w/Bbit card	499

INPUT/PRINT

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Abaton Flatbed 300 scanner	399
Dest 1020 Scanner	499
HP Scanjet	499
Leaf 45 Film Scanner	12999
Howtek ScanMaster III+	3999
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Montage FR-1	3495
Voice Navigator II	499

PRINTERS

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Apple LaserWriter IInt/ntx	799/999
AST Turbo PostScript Laser	1399
GCC WriteMove II portable	399
HP PaintWriter XL	599
IBM Pageprinter II	999
LaserMax B00, 135 fonts	2499
Mitsubishi G370-10u 300dpi color	1999
NEC LCB90 SilentWriter	999
Newgen Turbo PS400-PS/840e	1099/1499
QMS ColorScript 100 m10	1999
QMS ColorScript 100 m30 11x17	4999
QMS 4MB Upgrade, legal pack for ColorScript 100 (above)	499
Qume Crystal Print Publisher II	999
Qume ScripTen	1399
Ricoh Laser 6000/ps	999
Texas Instruments 210B	999

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HARD DRIVES



FUJITSU **1.2GB ONLY $865**

Capacity	Description	Internal	External	
520MB	3.5" HH 9ms	$485	$545	
1200MB	3.5" HH 9ms	$865	$925	SALE
2400MB	5.25" FH 11.5ms	$1385	$1485	

Fujitsu Drives carry a 5 year warranty

Quantum **540MB ONLY $465**

Capacity	Description	Internal	External	
GO170MB	2.5" NB 17ms	$255	$385	
GO256MB	2.5" NB 17ms	$345	$445	
42 MB	3.5" LP 1 7ms	$109	$169	
85MB	3.5" LP 17ms	$165	$215	
170MB	3.5" LP 17ms	$205	$265	
240MB	3.5" LP 10ms	$245	$305	
270MB	3.5" LP 10ms	$265	$325	
340MB	3.5" LP 10ms	$305	$365	
540MB	3.5" LP 10ms	$465	$525	SALE
1000MB	3.5" HH 10ms	$795	$855	
1200MB	3.5" HH 10ms	$965	$1025	
1800MB	3.5" HH 10ms	$1075	$1135	

Go Drives carry a 1 year warranty
The rest carry a 2 year warranty

Seagate **2400MB ONLY $1745**

Capacity	Description	Internal	External	
1200MB	3.5" HH 10.5ms	$865	$925	
1900MB	Barracuda 1, 8ms	$1535	$1595	
2400MB	Barracuda 2, 8ms	$1745	$1805	SALE
2400MB	3.5" HH 10.5ms	$1545	$1605	
3400MB	5.25" FH llms	$2150	$2250	

Seagate Drives carry a 1 year warranty.

Maxtor **290MB ONLY $275**

Capacity	Description	Internal	External	
290MB	3.5" LP 10ms	$275	$335	SALE
345MB	3.5" LP 10ms	$335	$395	
540MB	3.5" HH 8.5ms	$699	$759	
1200MB	3.5" HH 8.5ms	$1199	$1259	

Maxtor 3.5" Drives carry a 1 year warranty.

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- SuperMac Spectrum IV,
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- Syquest 88C read/write drive
- Texas Instruments Pro 600, 9ppm, 600dpi laser printer

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1. 24 hour approvals
2. 100% tax deductible
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24 hour approvals, CALL NOW!

SCANNERS



Model	Description	Price
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ScanMaker II/UC630	24-bit Color, 600x300 dpi	$659/659
ScanMaker IIxe/UC840	24-bit Color, 600x300 dpi	$989/895
Transparency	For Microtek & UMAX	$599/699
UMAX		

SCAN AV

Scan AV 4800x4800 dpi 24-bit color only $589

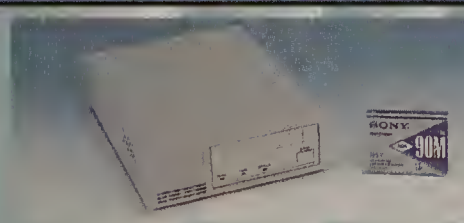
Scan AV 6400x6400 dpi 24-bit color only $699

SYSTEMS



Model	Description	Price	
Q950 8/200	5uperMac 20T, Keyboard	$5599	
Q840AV 8/200/CD	SuperMac 17, Keyboard	$4099	SALE
Q650 8/200	17" Monitor, Keyboard	$2799	
Q660AV 8/250	14" Monitor, Keyboard	$2139	
Q605 8/160	14" Monitor, Keyboard	$1489	
PM8100 8/200/CD	5uperMac 20T, Keyboard	$6789	
PM8100 8/200/CD	5uperMac 17, Keyboard	$5659	
PM7100AV 8/200/CD	SuperMac 20T, Keyboard	$5999	
PM7100 8/200/CD	5uperMac 17, Keyboard	$4199	
PM6100 8/160	14" Monitor, Keyboard	$2169	

TAPE DRIVES

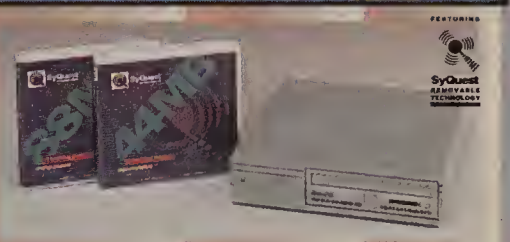


Model	Capacity	Size	MacKit	
Archive Viper 250	250MB	3.5"HH	$499	
Archive Viper 525	500MB	3.5"HH	$699	
Sony 5DT-2000	2Gbyte	3.5"HH	$879	
Sony 5DT-4000	4Gbyte	3.5"HH	$899	SALE
Sony SDT-5000	5-16 Gbyte	3.5"HH	$1299	
Exabyte 8200	2Gbyte	5.25"FH	$1299	
Exabyte 8500	5Gbyte	5.25"FH	$2199	
Exabyte 8205	2-5Gbyte	5.25"HH	$1595	
Exabyte 8505	5-10Gbyte	5.25"HH	$2275	

Includes external drive, 25/50 5CSI Cable, MAC SW II, and Terminator. Retrospect add $75

Tape			
Sony DAT	$22	Maxell 8mm	$19

SYQUEST DRIVES



Model	Internal	External	
5yquest 270	$499	$599	
Syquest 200	$459	$499	SALE
Syquest 105	$279	$319	
Syquest 88C	$275	$329	
Syquest 44	$199	$229	

Includes external drive, 25/50 SCSI Cable, Mac SW, Terminator

Cartridges	44MB cartridges only $49.99
270MB Cartridges	*(5+ or with drive purchase)*...$98.99
200MB Cartridges	*(5+ or with drive purchase)*...$98.99
105MB Cartridges	*(5+ or with drive purchase)*...$58.99
88MB Cartridges	*(5+ or with drive purchase)* $72.99
44MB Cartridges	(5+ or with drive purchase).....$49.99

OPTICAL DRIVES



5.25" Optical Drives	SONY 650MB only $1999			
Model	Capacity	Seek	MacKit	
Sony-650	594/650mb	66ms	$1999	SALE
Ricoh-9200 EX	594/650mb	35ms	$1849	
MaxOptix-Tahiti II/III	594/650/1gb	25ms	$2599/2999	
PMO-650/1.3	594/650/1.3	19*ms	$2599/2799	
HP1.3	594/650/1.3GB	25ms	$2695	

Includes external drive, 25/50 SCSI Cable, Mac SW, and Terminator

Cartridges	Price
D5C 594/650MB	$85
3M 594/650MB	$99
Sony 594/650MB	$119
Sony 1.3GB	$139

650MB ONLY $85

3.5" Optical Drives	Panasonic 128MB only $689			
Model	Capacity	Seek	MacKit	
Panasonic	128mb	35ms	$689	SALE
Fujitsu-128	128mb	30ms	$865	
Sony P-301	128mb	35ms	$1049	
Most-256	128/256mb	37ms	$895	

Includes external drive, 25/50 SCSI Cable, Mac SW, and Terminator

Cartridges	Price
D5C 128MB	$29
Komag 128MB	$33
Sony 128MB	$45

128MB ONLY $29

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Disk Array RAID Systems	MacKit
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VideoVision Studio	3299
StageTwo Rocket	1499

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ArtZ Bundle	469
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PaintBoard Turbo XL	1099
PaintBoard Lightning	780
Clearview 17"	899
Horizon 24	2199

SUPERMAC

Spectrum Power 1152	$1179
SuperMatch 20 TXL	2149
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Digital Film Delux	3199
Thunder II / GX	2299/2699
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ThunderStorm	419
Supermatch 17•T	1045

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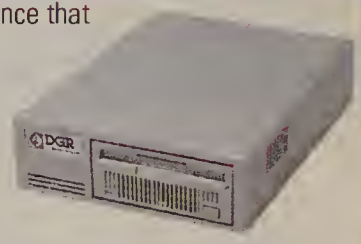


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3000MB	MC1936AV	$2159	$2259

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Capacity	Model	Internal	External
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270MB	LPS270S	$238	$298
340MB	LPS340S	$275	$335
540MB	LPS540S	$444	$504
1080MB	EMP1080S	$739	$799
1800MB	PD1800S	$969	$1029

Capacity	Speed	RPM	Buffer	Brand	Warranty	Internal	External	
105MB	19ms	4464	31K	Maxtor	1 Year	$469 (Type III PCMCIA)		
170MB	17ms	3600	32K	Quantum	2 Years	$179	$239	
240MB	14ms	4500	256K	Fujitsu	1 Year	$309 (2.5" for Powerbook)		
270MB	12ms	4500	128K	Quantum	2 Years	$238	$298	
340MB	12ms	4500	128K	Quantum	2 Years	$275	$335	
530MB	13.8ms	4500	256K	Fujitsu	5 Years	$389	$449	BEST BUY!
540MB (LPS)	12ms	4500	128K	Quantum	2 Years	$444	$504	
540MB (EMPIRE)	9.5ms	5400	512K	Quantum	5 Years	$509	$569	
1052MB	8.5ms	5400	256K	Micropolis	5 Years	$779	$839	
1060MB	9ms	5400	512K	Conner	5 Years	$749	$809	
1080MB	9.5ms	5400	512K	Quantum	5 Years	$725	$785	BEST BUY!
1080MB	9.5ms	5400	256K	Fujitsu	5 Years	$725	$785	
1440MB	9.5ms	5400	512K	Quantum	5 Years	NEW	CALL	
1690MB	8ms	7200	1024K	Seagate	5 Years	$1459	$1559	
1750MB	10ms	5400	256K	Micropolis	5 Years	$999	$1059	
1800MB	10ms	4500	512K	Quantum	5 Years	$969	$1029	
2145MB	8ms	7200	1024K	Seagate	5 Years	$1689	$1769	
2148MB	9ms	5400	512K	Seagate	5 Years	$1429	$1529	
2160MB	9.5ms	5400	512K	Quantum	5 Years	NEW	CALL	
3020MB	11ms	5400	256K	Micropolis	5 Years	$2139	$2169	

Includes formatting software and cables. We stock multiple bay enclosures for custom configurations.

SYQUEST DRIVES

Capacity	Compatible	Model	Speed	Buffer	Warranty	Internal	External
88MB	44, 88MB	SQ5110C	20ms	32K	2 Years	$369	$419
105MB	105MB	SQ3105	14.5ms	64K	2 Years	$289	$349
200MB	44, 88, 200	SQ5200C	18ms	64K	2 Years	$519	$579
270MB	105, 270MB	SQ3270	13.5ms	128K	2 Years	$509	$569

Media Qty 1 / 5 88MB $96 / $89ea. 105MB $58 / $56ea. 270MB $93 / $89ea.

INCLUDES 1 CARTRIDGE, formatting software, and cables. Multiple Syquest drive towers in stock!

CD ROM DRIVES

Brand	Model	Speed	Transfer	Type	Internal	External	
Teac	CD-50	265ms	335KB/sec	Single disk	$299	$359	
Toshiba	XM3401	200ms	330KB/sec	Single disk	$349	$409	
NEC	CDR510	195ms	450KB/sec	Single disk	$439	$499	BEST BUY!
Pioneer	DRM-602X	300ms	307KB/sec	6 Disc Changer	n/a	$919	
Pioneer	DRM-604X	300ms	614KB/sec	6 Disc Changer	n/a	$1169	
Pioneer	DRM-1804X	300ms	614KB/sec	18 Disc Changer	n/a	$2099	

Includes driver software with music play, $25 Photo CD processing coupon, and cables. Multi Drive CD Towers in stock!

TAPE DRIVES

Capacity	Type	Brand	Speed	Internal	External	
250MB	QIC 150	Archive	7MB/min	$459	$529	
2Gig	DAT	Conner	11MB/min	$839	$899	
4-8Gig	DAT	Conner	88MB/min	$1269	$1329	
4-8Gig	DAT	Hewlett Packard	42MB/min	$1089	$1109	
4-10Gig	DDS-2 DAT	Sony	88MB/min	$1139	$1199	BEST BUY!
4-10Gig	DDS-2 DAT	HP (Fastest Tape!)	88MB/min	$1449	$1499	

Includes Retrospect 2.0, 1 tape, and cables. OPTIMA DeskTape Software mounts DAT on desktop $289.

OPTICAL DRIVES

Capacity	Speed	Brand	Cache	Feature	Internal	External
1.3Gig	23ms	Hewlett Packard	512K	MultiFunction	N/A	$2679
1.3Gig	19ms	Maxoptix	4MB	MultiFunction	N/A	$2799

Includes formatting software, 1 disk, and cables. 256MB Fujitsu and 650MB HP models also in stock.

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apacity	Seek	RPM	Disc Cache	Int	Ext
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LPS Series

Capacity	Seek	Int.	Ext.
240 MB	10ms	245	305
270 MB	10ms	CALL	CALL
340 MB	10ms	285	345
540 MB	12ms	420	485

LPS and ELS series includes a 2 year warranty.

GO Drive Series

Capacity	Seek	Int.	Ext.
42 MB	17ms	99	155
127 MB	17ms	230	315
170 MB	17ms	255	335
256 MB	17ms	345	425

Empire and Pro Series

Capacity	Seek	RPM	Disc Cache	Int	Ext
540 MB	9.5ms	5400	512K	$545	605
1080 MB	10ms	5400	512K	775	835
New Price! 1800 MB	10ms	4500	512K	995	1055

Includes 5 year factory warranty

Seagate

Capacity	Model	Size	Access	RPM	Disc Cache	Int	Ext
1.2 GB	ST31200N	3.5	10ms	5400	256K	$775	$835
1.9 GB	ST11950N	3.5"	8ms	7200	1024K	1485	1545
2.4 GB	ST 12550N	3.5"	8ms	7200	1024K	1725	1785
4.2 GB	ST15150N	3.5"	8ms	7200	1024K	Call	Call
3.4 GB Elite 3	ST 43400N	5.25"	10ms	5400	512K	2125	2225
9 GB Elite 9	ST 410800N	5.25"	11ms	5400	512K	CALL	CALL

All Seagate drives came with a 5 year factory warranty and are backed by a 30 day money back guarantee. External drives came with a double shielded system cable and external termination. All advertised models are SCSI 1 & 2 compatible.

MICROPOLIS

Capacity	Model	Size	Access	RPM	Disc Cache	Int.	Ext.
1.2 GB	M4110	Low Profile	8 MS	5400	256K	$795	$855
1.2 GB	M2210	3.5"	10 MS	5400	512K	795	855
New Price! 1.7 GB	M2217	3.5"	10 MS	5400	512K	1055	1115
2.4 GB	M1926	3.5"	11 MS	5400	256K	1420	1520
3.6 GB	M1936	5.25"	11 MS	5400	256K	2135	2195
Direct to Disk Recording AV Drives							
1.2 GB	M2210AV	3.5"	10 MS	5400	512K	860	920
New Price! 1.7 GB	M2217AV	3.5"	10 MS	5400	512K	1115	1175
3.6 GB	M1936AV	5.25"	11MS	5400	512K	2185	2285

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- Fast SCSI-2
- 5 Year (HOT SWAP) Warranty
- 300,000 Hours MTBF
- COMES WITH QUADRA AV

SyQuest

Capacity	Model	Seek	RPM	Buffer	Int	Ext
44MB	SQ555	20ms	3200	8K	249	309
88 MB	SQ5110C	20ms	3200	32K	379	439
NEW! 105 MB	SQ3105	14.5ms	3600	64K	319	379
270 MB	SQ3270	13.5ms	3200	128K	619	659

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Removable Media		Price
44 MB	SQ400	$59
88 MB	SQ800	89
105 MB	SQ310	59
200 MB	SQ2000	99

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Memory Products

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4x8x80	145	**8 MB -70 ns/ 8 MB ns**	295/305
4x8x80(FX)	150	16 MB 70 ns	605
16x8x80(Low Profile)	625	32 MB -60 ns	1295
16x8x80 (FX)	619	**VRAM**	
		Video RAM 256K/512K	20 / 38

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FUJITSU

Capacity	Model	Access	RPM	Disc Buffer	Int	Ext
40 MB	M2637, 2.5"	14ms	4500	128K	$335	$435
20 MB	M2624 F/A	9ms	4500	512K	$565	$605
.2 GB	M2694ESA	8.5 ms	5400	512K	$795	$855

DynaMO 128 — 128 MB — Dyna MO 30 ms, 3600 RPM, SCSI-2 — $865

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Capacity	Model		Int.	Ext.
1.2 GB	C2247	3.5"	$995	$1055
2.4 GB	C2490	3.5"	1995	2055
2.35 GB	C3010	5.25"	1975	2075
Optical Drives				
1.3 GB MO	C1716T	23.5ms	2599	2699

TAPE BACKUP DRIVES

Capacity	Model	Media	Int.	Ext.
2.0 GB	HP35470A	4mm	$1025	$1045
3-5 GB	HP35480A	4mm	1199	1219
4-10 GB	HP1533A	4mm	1565	1585
20-50 GB	HP1553A & Auto Tape Looder		3495	3595
2-5 GB	Exobyte 8205	8mm	1599	1625
5-10 GB	Exobyte 8505	8mm	2549	2569
20-50 GB	Exobyte 10i	Auto Tape Loader	CALL!	

ProDirect tape backup systems include Retrospect backup software. Drives come with media.

QMS PRINTERS

Model	Price
PS 410 4PPM,300DPI	$1399
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***PS 860 8PPM, 600 DPI, 11x17**	$3825
12 MB exp. 32 MB,39 Fonts, PS L 1& 2, RISC Processor	
PS 1725 17PPM, 600 DPI, *New Price !	$4399
8 MB Exp. to 32 MB, PS Level 1 & 2, RISC Processor	
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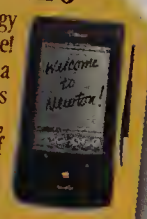


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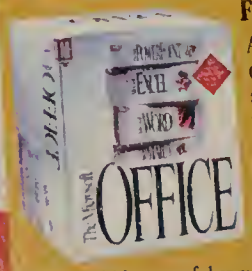
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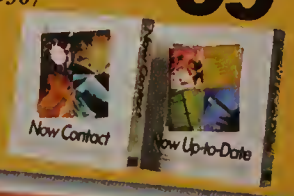
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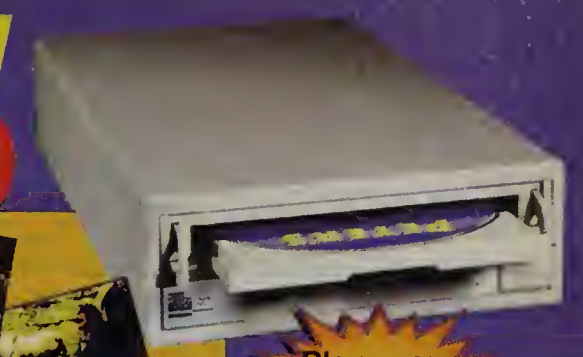
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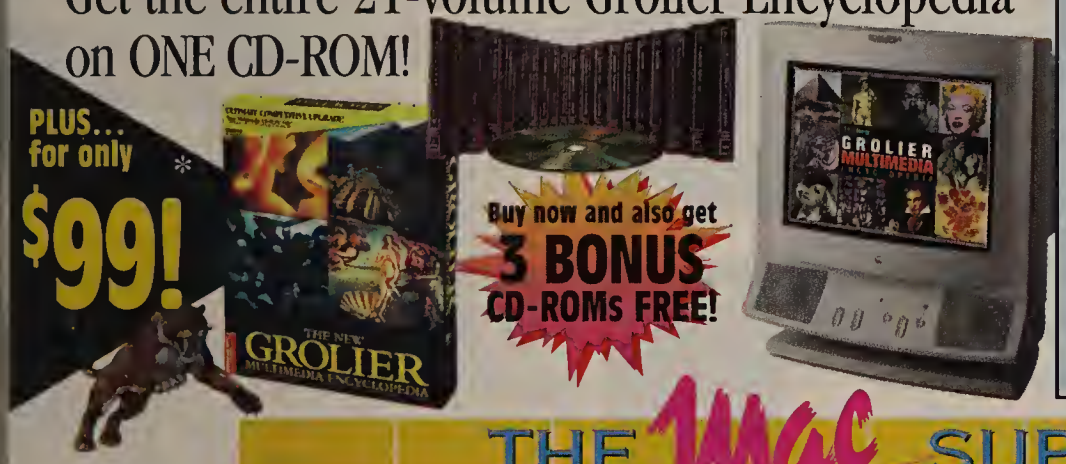
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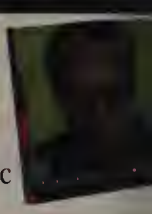
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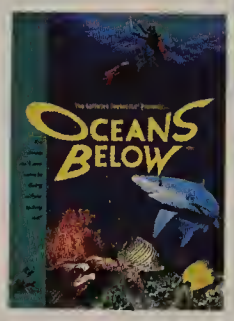
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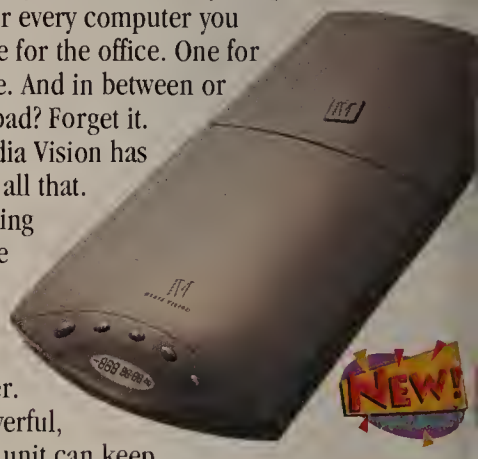
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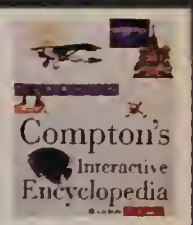
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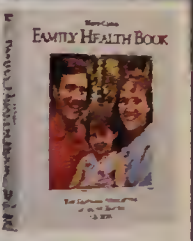
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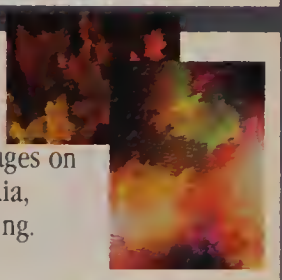
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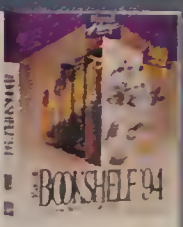
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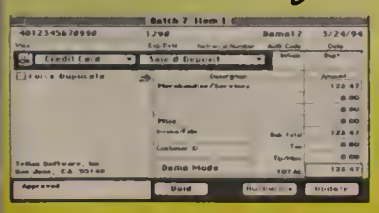
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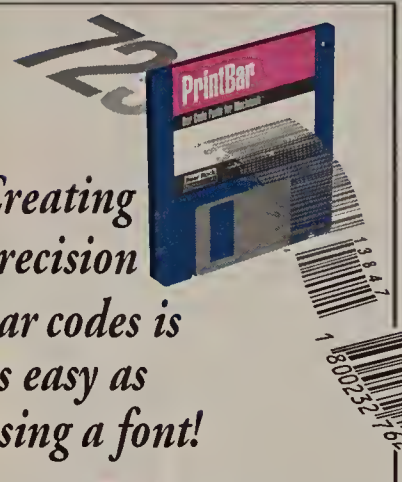
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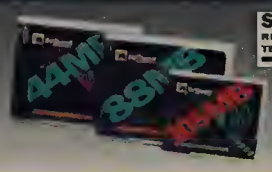
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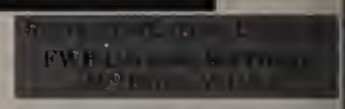
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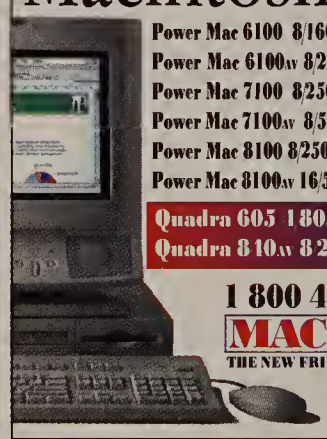
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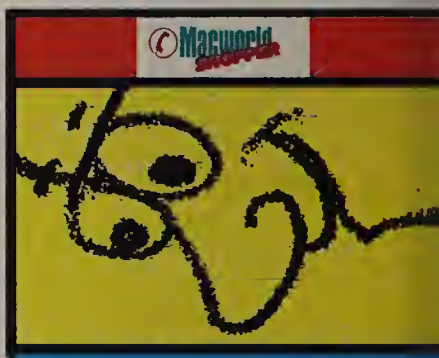
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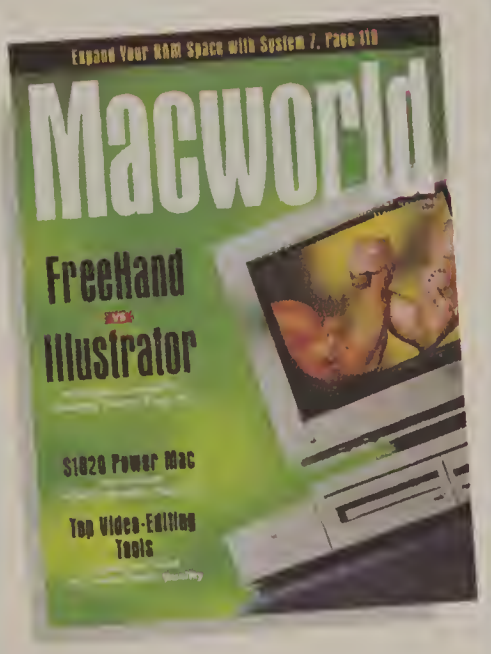
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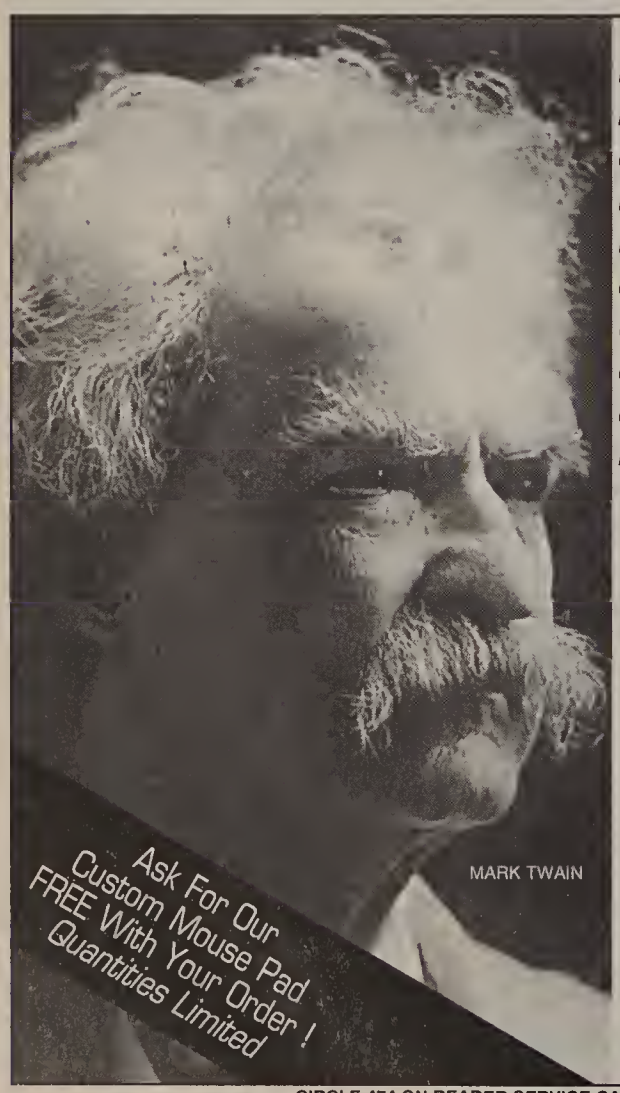
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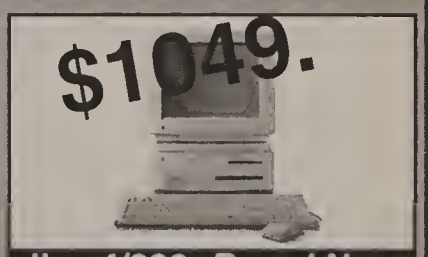


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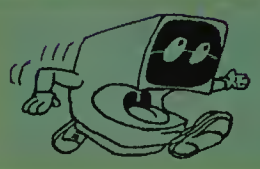
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Quadra 610 8/160	$1308
Quadra 610 8/160 (DOS Compatible)	$1432
DOS Compatible Card for Q610	$349
Quadra 610 8/230	$1648
Quadra 610 8/230/CD	$1964
Quadra 650 8/230	$1933
Quadra 650 8/230/CD	$2248
Quadra 650 8/500/CD	$2789
Quadra 660av 8/80	$1650
Quadra 660av 8/230	$1706
Quadra 660av 8/230/CD	$1964
Quadra 660av 8/500/CD	$2505
Quadra 840av 8/230	$2756
Quadra 840av 8/230/CD	$3007
Quadra 840av 16/500/CD	$3808
Quadra 840av 18/1000/CD	$4420
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6100/60 AV Upgrade	$1285
7100/66 8/250	$2631
7100/66 8/250 CD	$2885
7100/86 AV 8/500 CD	$3620
7100/66 SoftWindows 16/250	$3067
7100/66 AV Upgrade	$1545
8100/80 8/250	$3665
8100/80 8/250 CD	$3898
8100/80 SoftWindows 16/500	$4579
8100/80 AV 16/500 CD	$4882
8100/80 16/1000 CD	$5313
8100/80 AV Upgrade	$1810
Apple Mutliple Scan 20 Display	$1913
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LW Select 320	$860
LW Select 360	$1438
LW Pro 630	$1912
LW Pro 810	$4374
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HP Laserjet 4SI MX	$4670
Leserjet Toner	$120

Powerbooks

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145B 4/120	$1522
165 4/80	$1613
165 4/160	$1800
165 4/160 Modem	$2146
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180 4/120	$2055
180 4/120 Modem	$2296
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NEC 5FG 17"	$1260
NEC 6FGp 21"	$2480
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RasterOps 21"/24XLI	$2315
RasterOps 20t	$2066
E Machines T16	$995
SuperMatch 17T	$1175
SuperMatch 20 Txl	$2475

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GV PowerPort Gold	$280
GV PowerPort Mercury	$330
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Infinity 270	$600
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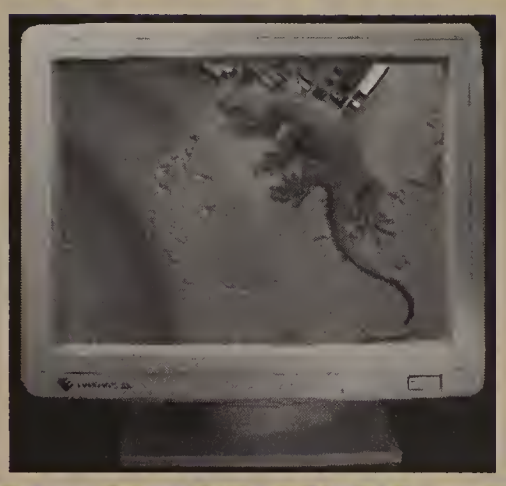
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660 AV 8-500 CD	$2099
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840 AV 8-230 CD	$2999
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7100/66 8-250 CD	$2890
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7100/66 AV 8-500 CD	$3629
8100/80 8-250	$3789
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Quadra 660AV

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Quadra 650

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8/230 W/CD	$2099
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8/160/CD	$1399
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Select 320 w/Toner	$879
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Pro 810 w/Toner	$4399
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LaserWriter II F	$899
LaserWriter II G	$1495
Apple Color Printer	$549

Hewlett Packard

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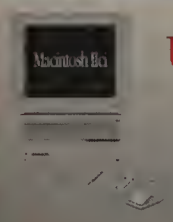
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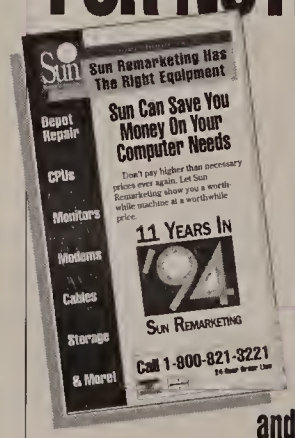


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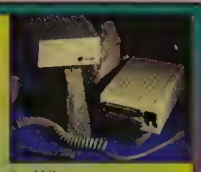
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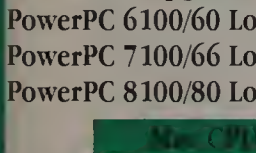
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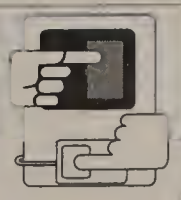
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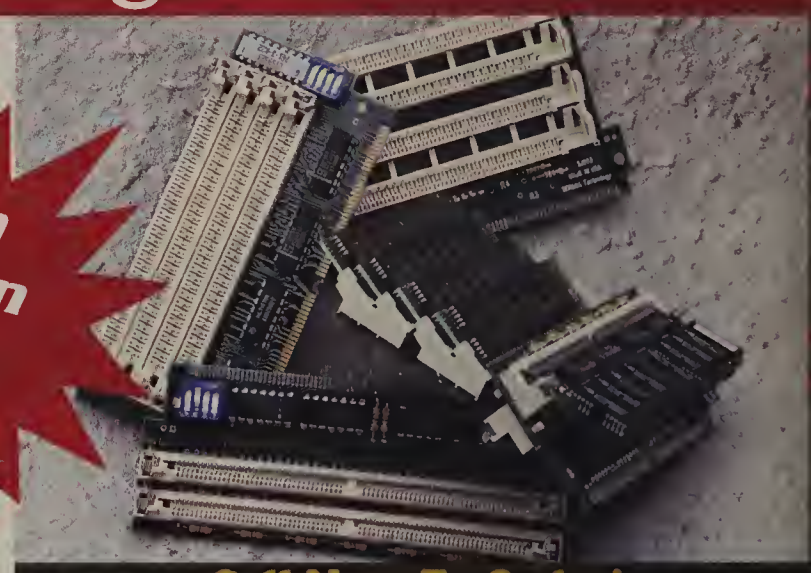
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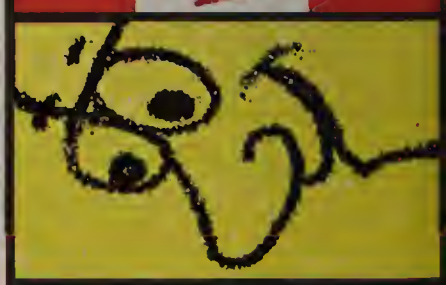
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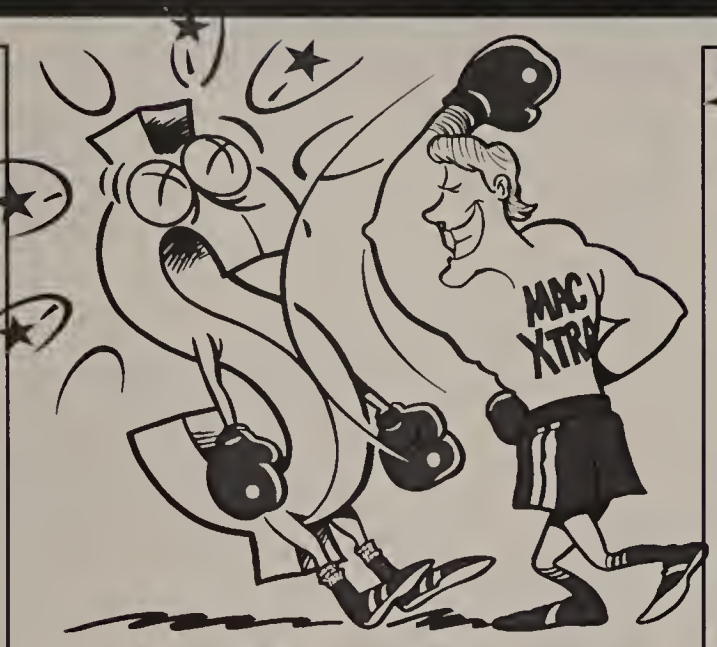
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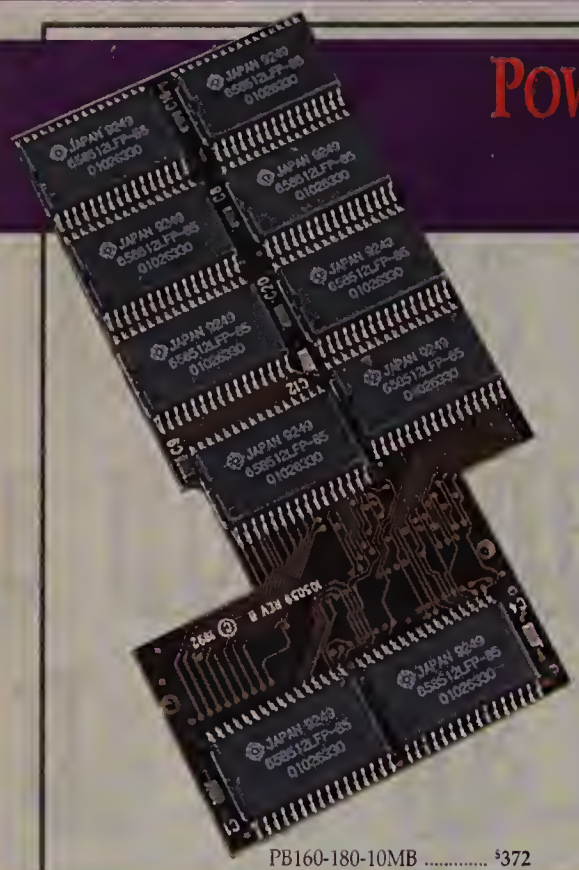
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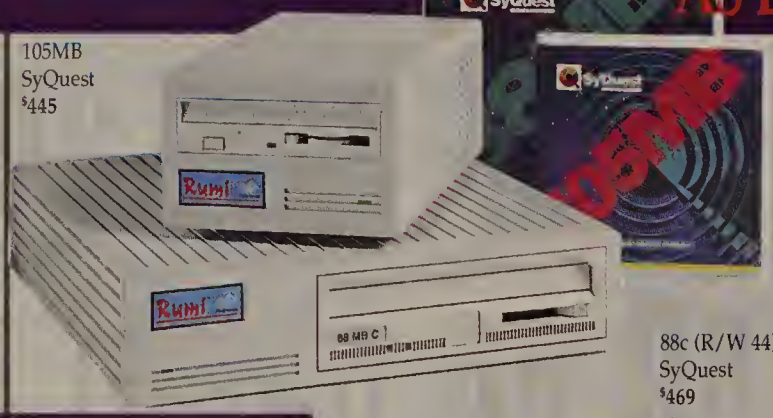


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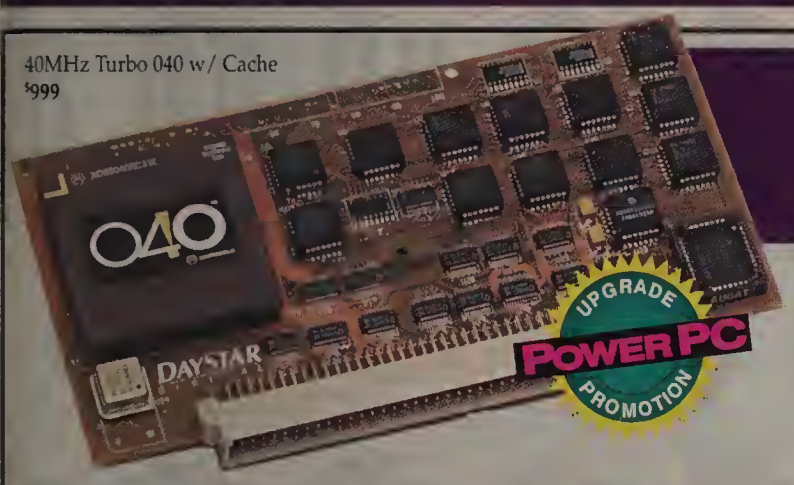
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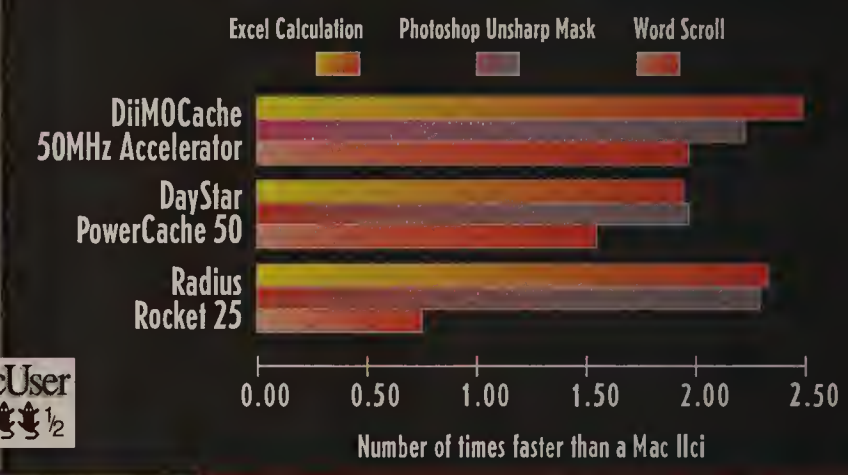
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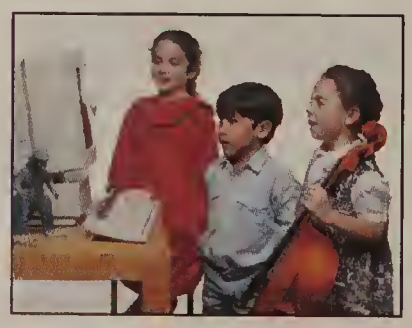
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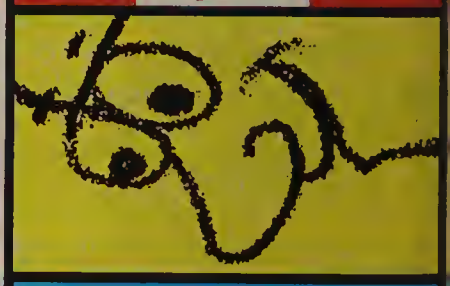
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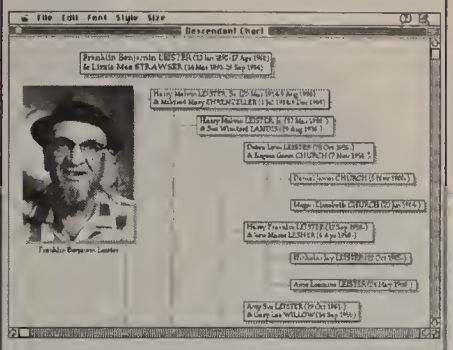
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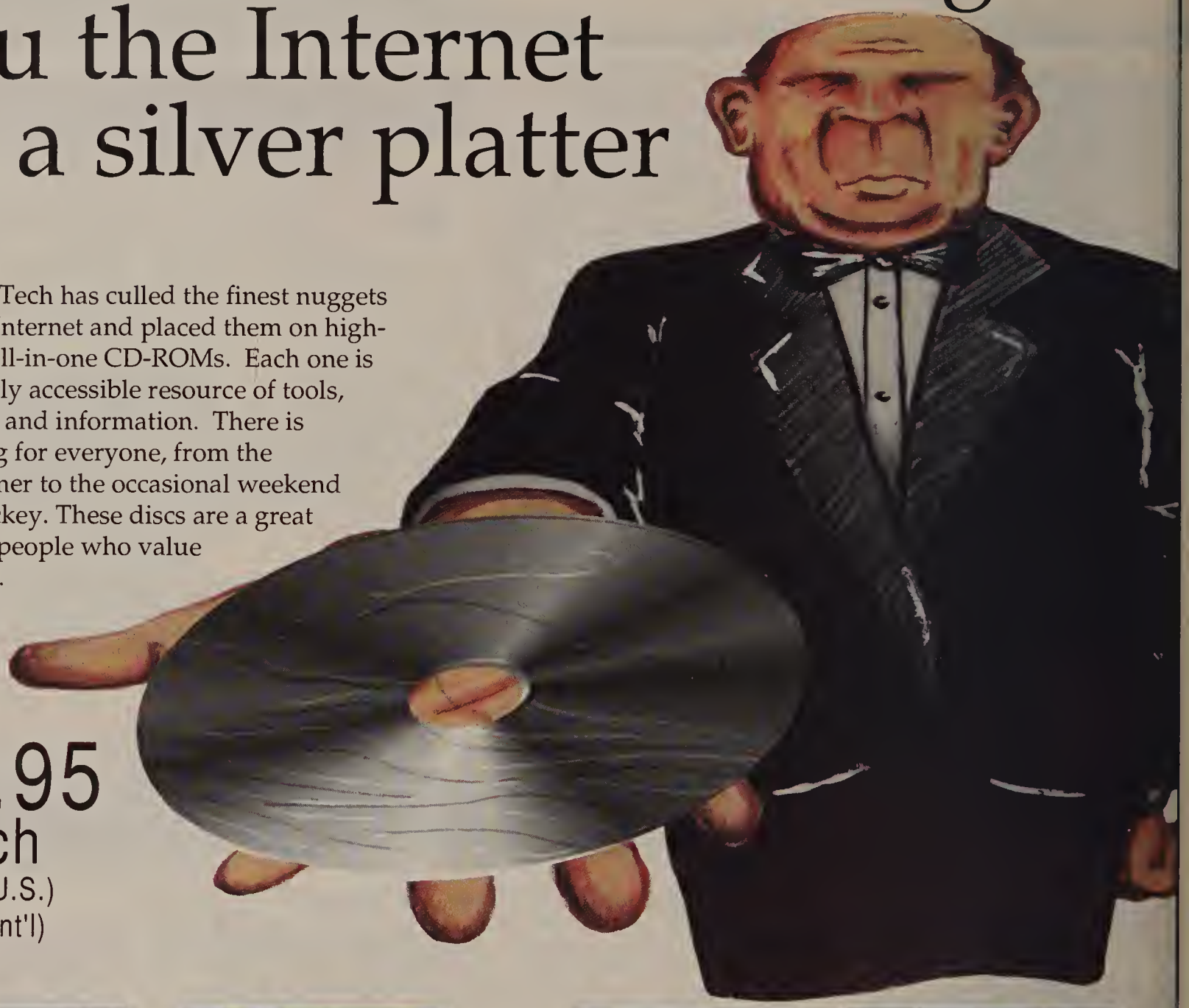
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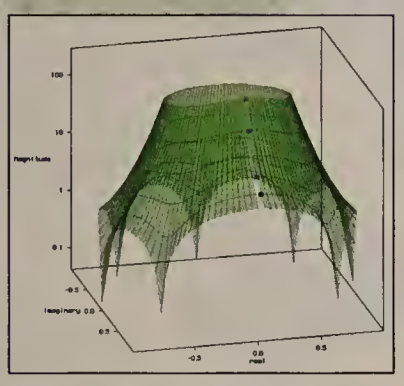
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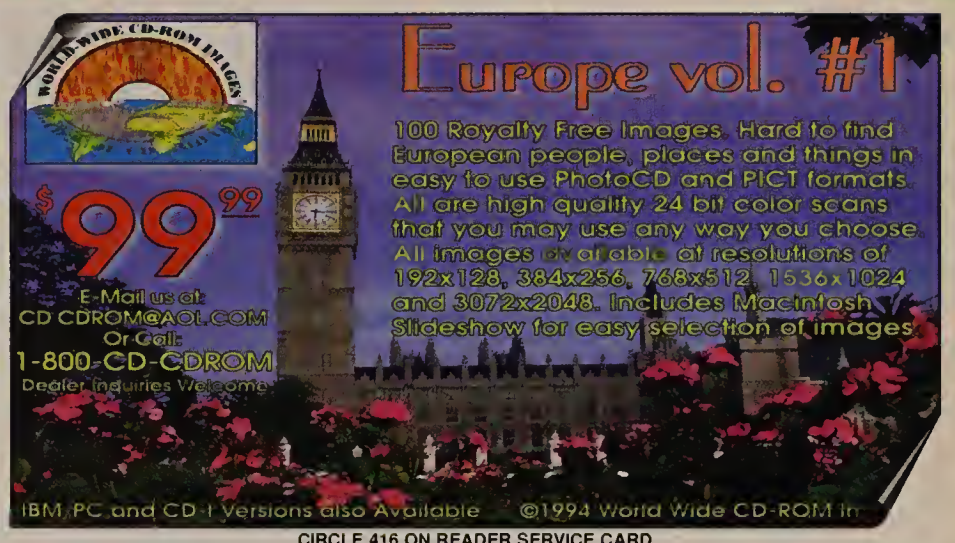


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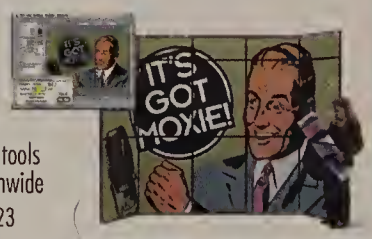
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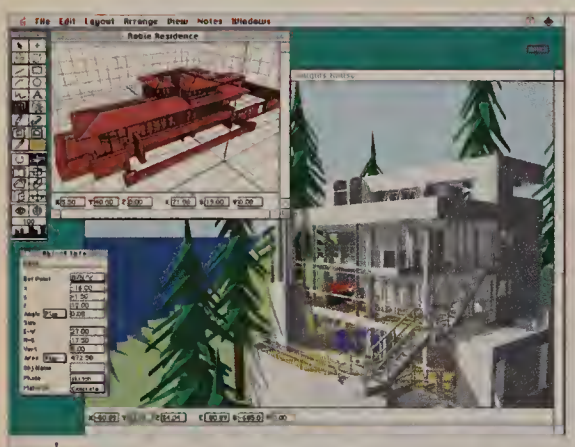
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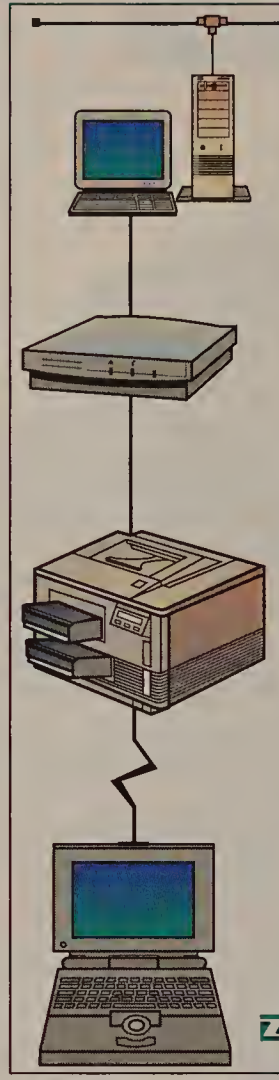
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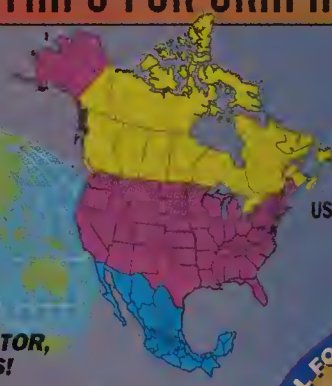
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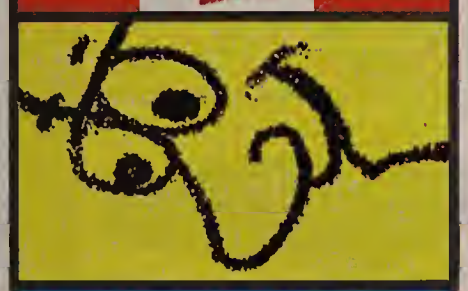
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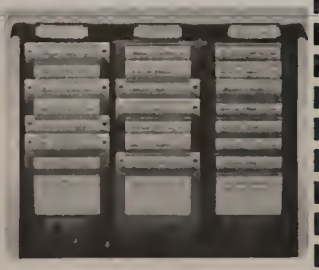


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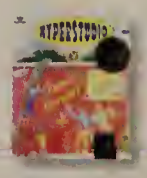


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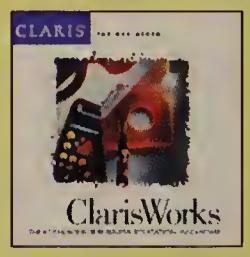
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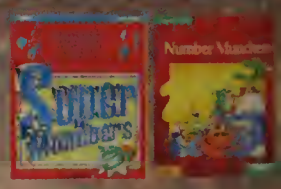


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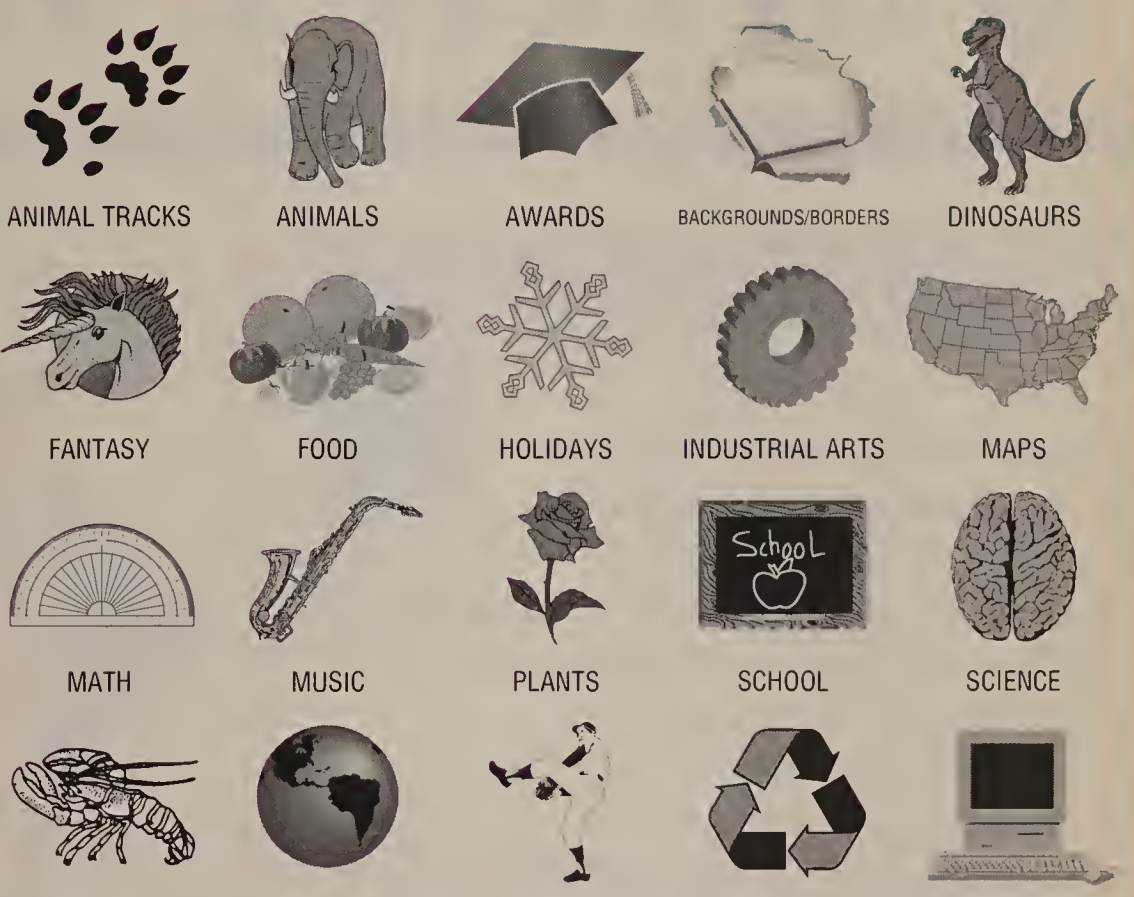
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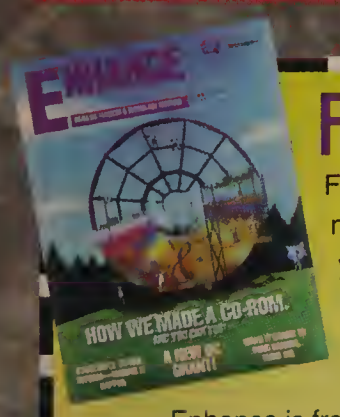
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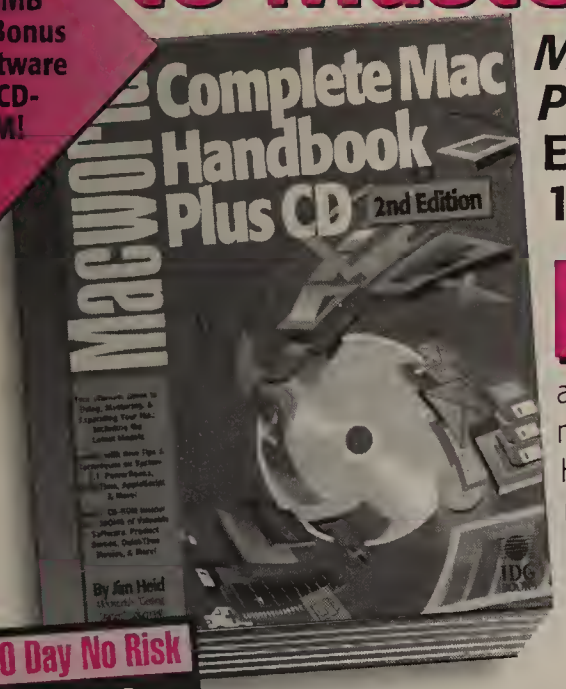
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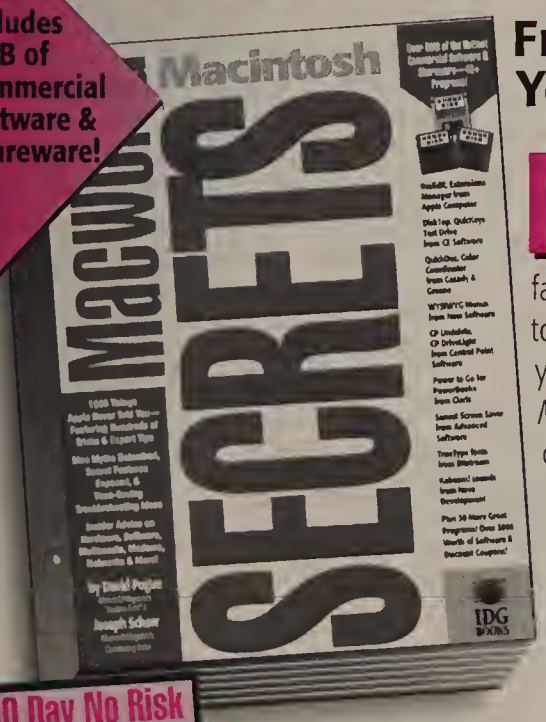
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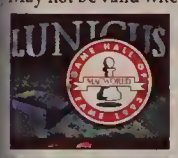
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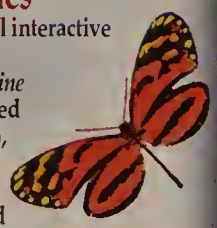
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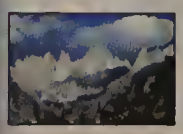


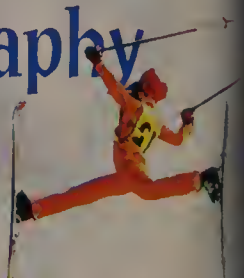
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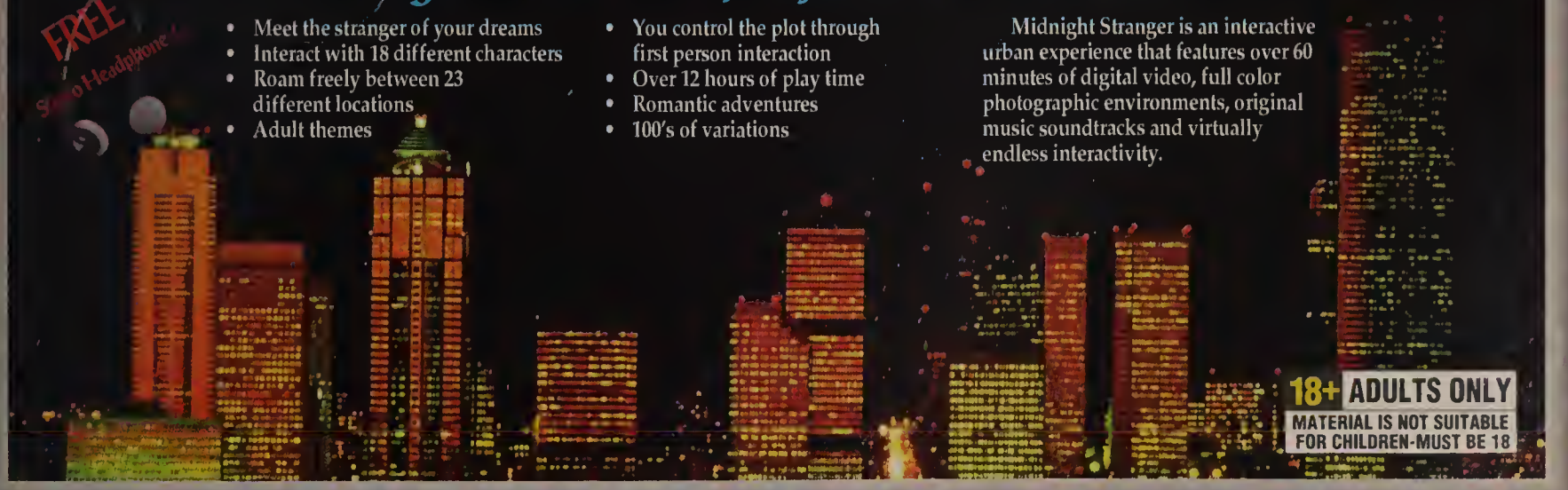


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WISE GUY

BY GUY KAWASAKI

Potholes along the Information Superhighway

If this is the highway, I'd rather hitchhike along a country road

FOR ONCE, THE REPUBLICANS have done the right thing. For a few months, because of the Whitewater controversy, we do not have to listen to Bill Clinton and Al Gore talk about the information superhighway. Say what you like about Bob Dole, he does know how to defocus national attention. While Whitewater occupies center stage, I would like to point out several potholes in the information superhighway.

Building What You Want to Use

Pothole #1: The wrong kind of people are trying to build the highway. The inventions that changed the world—such as the telephone, computer, and airplane—were created in the garages and labs of nerdy scientists and engineers, not in investment banks or boardrooms.

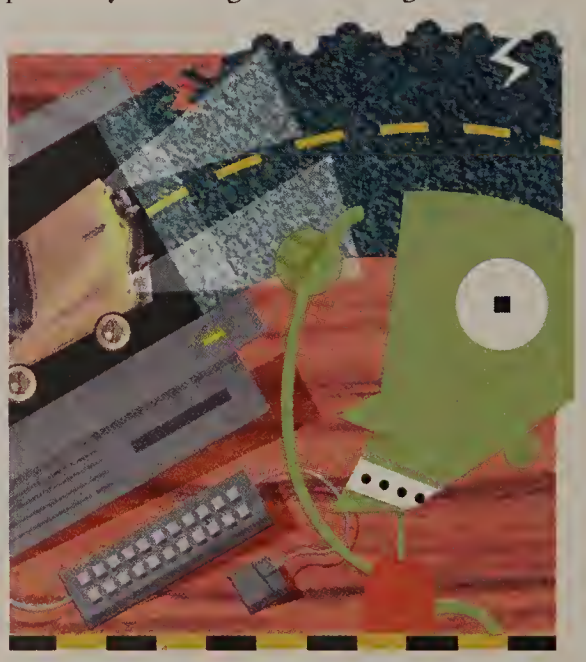
Making history and going where no one has gone before were the motivations—not fattening corporate coffers or stroking the (mostly male) egos of businesspeople. I once asked Steve Wozniak, the cofounder of Apple, what motivated him to design the Apple I and Apple II. His response: "I tried to build the computer that I wanted to use." If Apple had begun Macintosh development by merging with Xerox PARC, Microsoft wouldn't have had anything to copy when MS-DOS ran out of gas.

Pothole #2: Even if the business types were to succeed, do you really want them to? It's debatable whether there's enough good programming for today's 30 or so channels of video—much less for 500. Also, part of the beauty of 30 or so channels is that 30 is a surfable number. You can, through serendipity, find something that looks interesting.

How will we do this with 500 channels? It will be like trying to find something in 500 files on the desktop by opening them one at a time. Keyword searches won't work because you'd have to determine in advance the subjects that interest you. How many times have you flipped channels and stopped to watch something you didn't know you'd be interested in?

Shop until You Drop

Pothole #3: Who says everybody wants to shop at home? A handful of businessmen have decided how Americans—particularly American women—want to shop. The theory is that many consumers are so harried, busy, and yet bored with their lives that they want to flick on the shopping channel and watch Dianne Von Furstenberg show us the latest in gold-plated synthetic garnet earrings.



These businessmen don't get it, so as a stay-at-home Macintosh househusband, allow me to explain: Shopping is fun. It's sport. It's entertainment. People want to get dressed up, jump in a car, go to the mall, push strollers around, eat fast food and ice cream, and shop until they or their baby drops. They want to get out of the house and see other people—not be glued to the lobotomy box watching infomercials.

Big, Cheap, and Slow

Pothole #4: Books won't die. Part of the information superhighway vision is that books will die, and on-demand video or multimedia CD-ROMs will replace them. Books will never die because they have certain advantages: you can drop them; you can read them in low light; and you don't need to recharge their batteries or plug them in. Books also have a tactility and heft that a disc, cable, or satellite will not equal.

I've yet to see a CD-ROM worth buying—I don't even have my CD-ROM drive hooked up most of the time, because I need the electrical outlet for important things like a lava lamp. I'll concede that there are some cool educational CD-ROMs for children, and that CD-ROMs are acceptable for holding large quantities of information like collections of quotations for me to steal from. But in most cases CD-ROMs are nothing more than big, cheap, and slow mass-storage discs.

Also, the information superhighway vision of the dissemination of information is inherently elitist. Let us rue the day that people are forced to rely solely on TVs or computers to get information. And let us not be stupid enough to think that private enterprise will provide televisions or computers to everyone at the request of the government.

No Shoes

Pothole #5: Long after the mergers, alliances, and acquisitions (and the failures of said mergers, alliances, and acquisitions) are announced, it still comes down to implementation. Here's a little factoid for you: many parts of Washington, D.C., don't have cable television, circa 1994, because the various government agencies can't decide who should get the franchise. Pardon me? The billmaker's children have no shoes? **m**

GUY KAWASAKI's views are his own and only sporadically represent those of *Macworld*. His lastest book is *Hindsights* (Beyond Words Publishing, 1994). He has investments in Bit Jugglers, Global Village Communication, Bookmaker Corporation, and others. He can be reached at Kawasaki@radiomail.net.

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The first trackball in awards is first in something even more important.

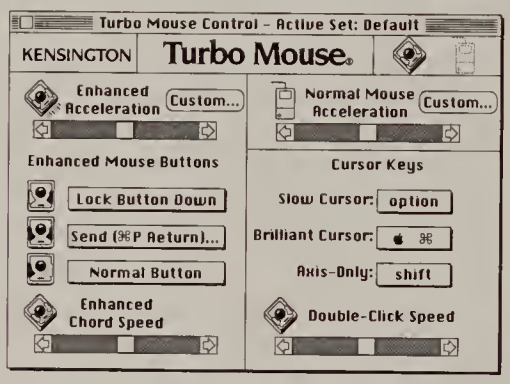
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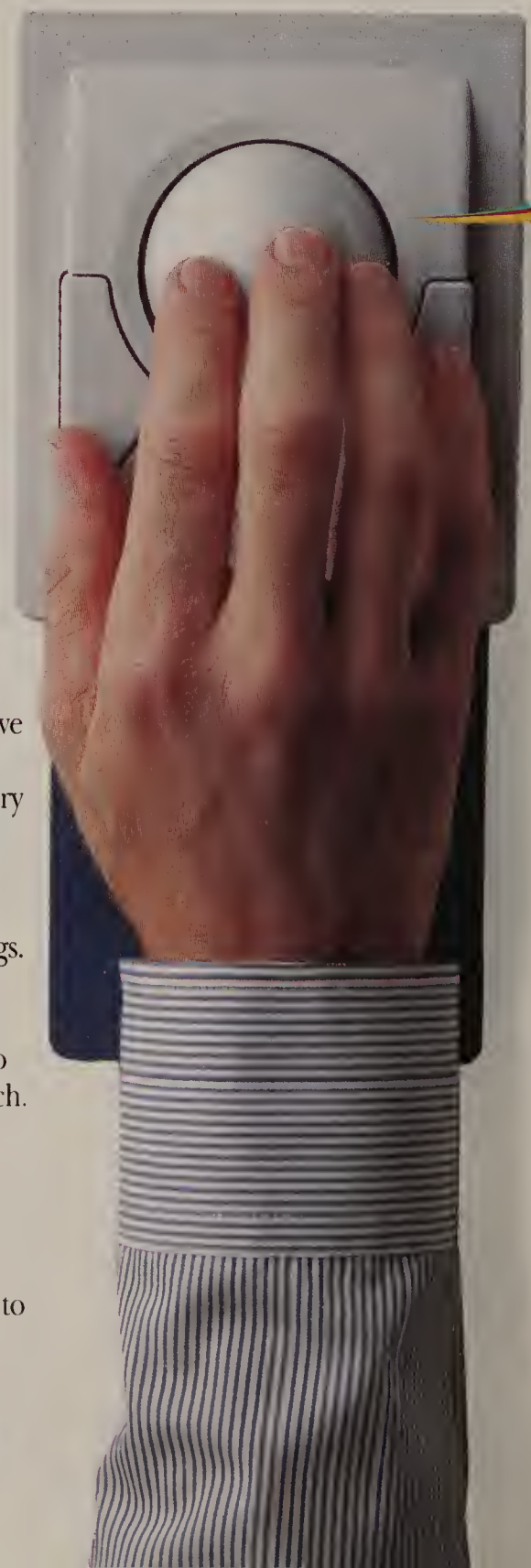
And it's more comfortable than an ordinary trackball. A unique combination of hardware and software make the difference.

Turbo Mouse has a large comfortable ball that rests on high-quality stainless steel bearings. The movement is ultrasmooth. Precise.

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